PROPOSED CONSTRUCTION AND OPERATION OF A BIOMASS CONVERSION CENTER FORT GEORGE G. MEADE, MARYLAND

DRAFT

ENVIRONMENTAL ASSESSMENT

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EXECUTIVE SUMMARY

The U.S. Army has prepared this Environmental Assessment (EA) to address the potential environmental impacts associated with the construction and operation of a Biomass Conversion Center (BCC) at Fort George G, Meade to dispose of the sludge generated from the Installation's wastewater treatment plant.

The Army currently owns and operates a 4.5 million gallon per day (MGD) capacity Advanced Wastewater Treatment Plant (WWTP) at Fort Meade in Anne Arundel County, Maryland. The WWTP collects and treats all domestic wastewater generated from Fort Meade. Sludge is separated from the wastewater stream during the treatment process and collected in holding tanks until it is hauled off site and used for land application throughout the region.

The hauling and disposal of sludge from the WWTP via land application is both expensive and labor intensive. As Fort Meade experiences increasing budget pressures, reduced manpower, and increasing utility and utility related costs, the Installation has expressed the need to reduce current sludge disposal costs, lockdown future escalations, and mitigate economic and environmental risks, including the uncertainty associated with fuel costs, land availability for land disposal of the sludge, and the environmental impacts of burning large amounts of vehicle fuel.

Fort Meade proposes to support the construction and operation of a BCC to dispose of the sludge separated in the WWTP, by utilizing extreme heat to convert the sludge into ash. The BCC would replace the current disposal method of hauling the sludge offsite for land application. Under the Proposed Action, sludge would be pumped from the WWTP holding tanks into receiving tanks at the BCC. The sludge would then be processed through a centrifuge, dried and subsequently conveyed to the combustion system.

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 et seq.), the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500 through 1508) for implementing NEPA, the 32 CFR Part 651 [Army Regulation 200-2] Environmental Analysis of Army Actions, and the Army Reserves NEPA Handbook.

This EA analyzes the potential environmental impacts that would result from the Proposed Action and alternatives. The Proposed Action alternative and the No Action alternative are the two reasonable alternatives considered for this project. Under the No Action alternative, the BCC would not be constructed.

Environmental Effects

No Action

Under the No Action alternative, there would be no direct impacts at the proposed project site on water resources; soils and land use; biological resources; cultural and historic resources; noise; and, hazardous materials and waste management. Minor beneficial impacts to socioeconomics would continue to be realized by the hauling contractor and farmers receiving sludge for use as fertilizer. There would, however, be direct adverse impacts to the socioeconomics of Fort Meade from both the high costs and economic risks associated with current sludge disposal methods, and indirect and cumulative adverse effects to air quality and infrastructure and utilities (transportation) from the continuation of hauling operations and associated vehicle emissions generated from these operations.

Proposed Action

The construction phase of the Proposed Action would result in temporary, negligible to minor, adverse impacts on water resources; soils and land use; biological resources; noise; hazardous materials and waste management; and, infrastructure and utilities. There would be temporary, negligible, beneficial impact on the local economy due to temporary employment during the construction activities.

During the operation phase of the Proposed Action, there would be short-term adverse, minor to moderate, impacts on the socioeconomics of both the hauling contractor and farmers who currently receive sludge for land application. Long-term, adverse, minor impacts on air quality in the region would result from operational emissions contributing incremental amounts of particulate matter and ozone depleting contaminants to a larger air quality problem. There would be negligible to minor, adverse impacts on water resources; biological resources; noise; waste and hazardous materials management, and infrastructure and utilities from operation activities. Long-term, moderate to major overall beneficial economic impacts to Fort Meade would be realized from the cost savings of operation and elimination of risks associated with the No Action.

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ACRONYMS AND ABBREVIATIONS

ASL	Active Sanitary Landfill
BCC	Biomass Conversion Center
BGE	Baltimore Gas and Electric
BOD	Biochemical (Biological) Oxygen Demand
BRAC	Base Realignment and Closure
BRAC 1	Defense Authorization Amendments and Base Closure Act of 1988 (Public Law 100-526)
BRAC 95	Base Realignment and Closure Act of 1990 (Public Law 101-510)
BWI	Baltimore-Washington International
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COMAR	Code of Maryland Regulations
CRMP	Cultural Resource Management Plan
CWA	Clean Water Act
DA	Department of the Army
dB	Decibels
dBA	A-weighted Decibel
DoD	Department of Defense
DNL	Day-Night Level
DNR	Department of Natural Resources
DPW	Directorate of Public Works
DRM	Directorate of Resource Management
DRMO	Directorate of Resource Management Operations
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ESA	Endangered Species Act
EUL	Enhanced Use Lease
FFCA	Federal Facility Compliance Act
FY	Fiscal Year
GMA	growth management area
GPD	gallons per day
HAPS	Hazardous Air Pollutants
HAZMAT	hazardous material
HCM	Highway Capacity Manual
HUD	Housing and Urban Development
INRMP	Integrated Natural Resource Management Plan
ISCP	Installation Spill Contingency Plan
ISWM	Integrated Solid Waste Management Plan
kV	Kilovolt

MDE	Maryland Department of the Environment
MGD	million gallons per day
mg/l	milligrams per liter
MHT	Maryland Historical Trust
MSDS	material safety data sheets
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSA	National Security Agency
O_3	Ozone
OSHA	Occupational Safety and Health
PM-10	particulate matter- with diameter of 10 microns or less
PPA	Pollution Prevention Act
ppm	parts per million
PTC	permit to construct
RCRA	Resource Conservation Recovery Act
SBA	Small Business Administration
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SPCC	Spill Prevention Control Countermeasures
SWDA	Solid Waste Disposal Act
SWMP	Stormwater Management Program
TAA	Tipton Army Airfield
tpd	tons per day
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WESP	Wet Electrostatic Precipitator
WWTP	Wastewater Treatment Plant

1.0 PURPOSE AND NEED

1.1 DESCRIPTION OF THE PROPOSED ACTION

The Army currently owns and operates a 4.5 million gallon per day (MGD) capacity Advanced Wastewater Treatment Plant (WWTP) at Fort George G. Meade in Anne Arundel County, Maryland (Figure 1-1). The WWTP was constructed in 1984 and collects and treats all domestic wastewater generated from Fort Meade, the National Security Agency (NSA) Complex and the D.C. Children's Center, in addition to pretreated industrial wastewater from the NSA Complex.

The Fort Meade WWTP collects an average of 2-3 MGD of wastewater via approximately 305,270 feet of sewer pipe. Upon entering the wastewater treatment plant, the wastewater first flows through the aerated grit chamber, where sand and other heavy materials are removed. Next, the wastewater flows through a comminutor, where the large solids are shredded.

The wastewater then flows to the rapid mix chambers, where various chemicals are added before flowing through the flocculation chambers. The wastewater flows on to the primary settling tanks where phosphorus, suspended solids, BOD, and scum are partially removed. After the primary settling tanks where suspended solids are separated, the wastewater continues through several treatment processes and is ultimately discharged primarily to the Little Patuxent River.

Figure 1-1. Fort Meade WWTP

The suspended solids material that settles out in the primary settling tanks is referred to as sludge, and this material contains on average only 5-6% solids. Much of the activated sludge accumulated in the nitrification settling tanks is reused in the nitrification reactors as return sludge. The remaining sludge, approximately 17,000 wet tons per year, is collected into holding tanks and lime stabilized by a contractor.

As regulated under the Clean Water Act, sludge must be disposed of by one of the following methods: drying and disposing in a landfill; transferred and used for land application; or destroyed in a combustion process. Currently Fort Meade is under an

agreement with an SBA certified 8(a) contractor to haul the sludge off site to be used for land application in Maryland and Virginia. The hauling and disposal of sludge from the WWTP via land application is both expensive and labor intensive. Approximately 725 truck loads of sludge are hauled off in 6,000 gallon capacity trucks from the WWTP each year (Williams, 2006).

Fort Meade proposes to construct a contractor-operated combustion center, hereafter referred to as the Biomass Conversion Center (BCC), to dispose of the sludge separated in the WWTP. The BCC would replace the current disposal method of hauling the sludge offsite for land application. Under the proposed action, sludge would be pumped from the WWTP settling tanks into two sludge receiving tanks at the BCC. The sludge would then be processed through a centrifuge to remove approximately 21,000 gallons per day of wastewater from the stream, which would be sent back to the WWTP for processing. The sludge remaining at the BCC would have a solids content of approximately 25%, and would then be fed into a tray dryer and subsequently conveyed to the combustion system.

The combustion process would utilize extreme heat to convert the sludge into ash. Air emissions would be generated during this process. The combustor would be designed to effectively use primary, secondary, and tertiary air to ensure the complete combustion of the sludge and reduce potential toxic air pollutant emissions. A heat exchanger would be installed to recover the heat from the exhaust stream and heat the air that is recycled to the dryer while also serving as a source of combustion air for the combustor.

Downstream of the combustion heat exchanger, the exhaust gas would be designed to go through a cyclone and then through a wet scrubber and Wet Electrostatic Precipitator (WESP). The three units would provide a combined reduction of 98% of particulate matter emissions. The WESP would be directly connected to an air stack and would be the only air emission source to the outside environment. The scrubber/WESP pollution abatement system is the recommended and accepted arrangement by the USEPA for the removal of particulate matter and hazardous air pollutants emitted during sludge combustion.

The combustor unit would also be equipped with a self cleaning auto ash system, which would transport the ash generated during combustion activities out of the unit and into an ash hopper located outside of the BCC building. The ash collectors would be covered to prevent dust from escaping. The ash hopper would be emptied weekly and delivered to a local landfill as a non hazardous waste source.

The BCC would initially be designed to process the wastewater load received by the WWTP at present-day conditions, up to 1,550 tons of dry sludge per year. This would require the BCC to dry and combust 564 lbs of dry sludge per hour throughout a 5-day week. The BCC would be staffed during the daytime and remotely operated during the evening hours. Over the weekends and holidays, the sludge would be stored in the receiving tanks located outside of the building. The system could be upgraded as needed to operate continuously in a 24 hr period for 7-day weeks.

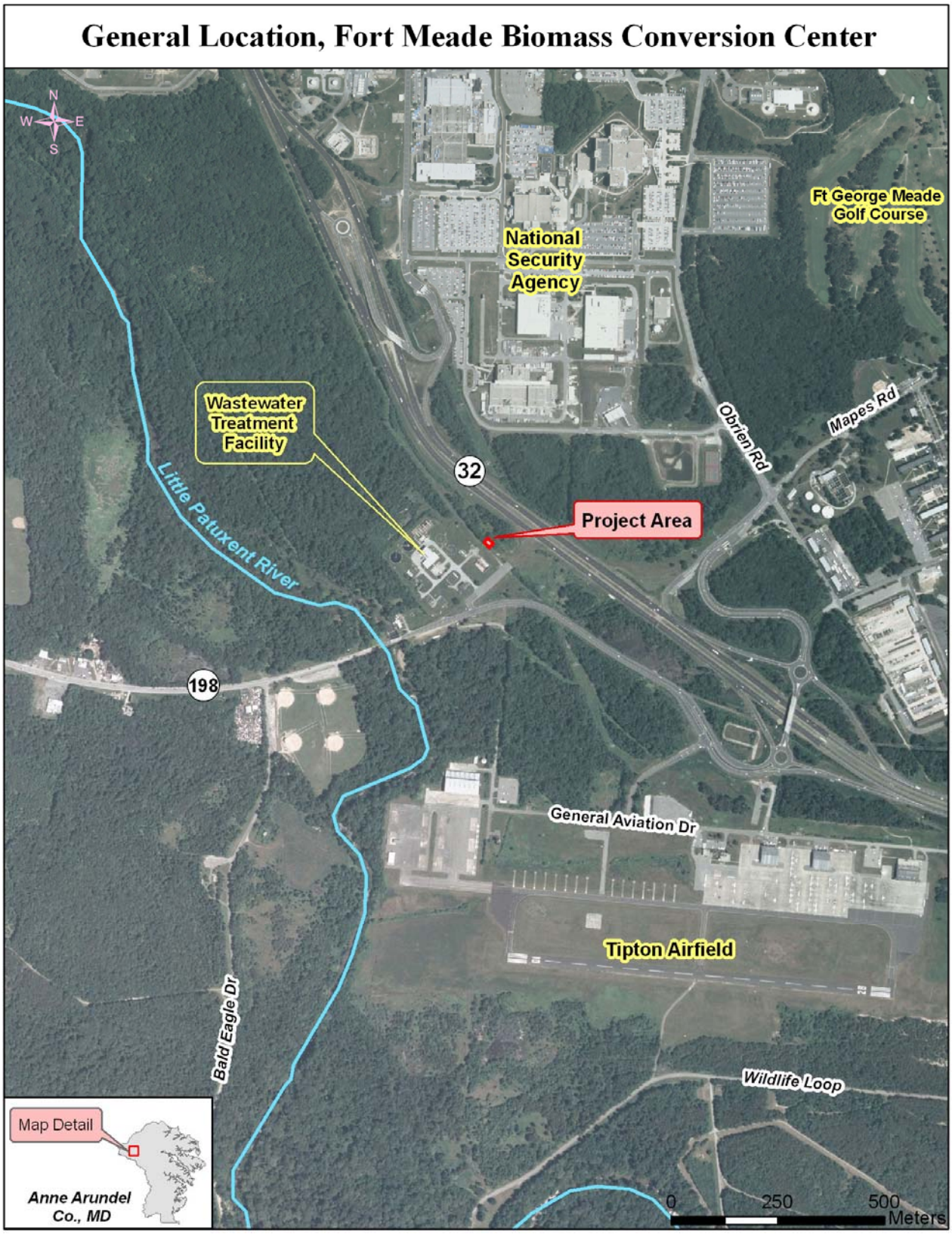

Figure 1-2 Project Vicinity Map

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Approximately 725 truck loads of sludge are hauled off in 6,000 gallon capacity trucks from the WWTP each year, with each trip averaging 215 miles roundtrip (Williams, 2006). This is costing Fort Meade approximately $1,200,000 annually (FY 2005), and in the long term these costs are conservatively estimated to escalate at 3% per year over the next ten years due to increased fuel costs and regulatory requirements associated with land application. Additionally, projected growth of the Installation over the next 5-30 years will significantly increase sludge disposal requirements.

As Fort Meade experiences increasing budget pressures, reduced manpower, and increasing utility and utility related costs, the Installation is at a crossroads and has a unique opportunity to reduce current sludge disposal costs, lockdown future escalations, and mitigate economic and environmental risks, including the uncertainty associated with fuel costs, land availability for land disposal of the sludge, and the environmental impacts of burning large amounts of vehicle fuel. Expenditures associated with the proposed action include operations and maintenance of the BCC, utility costs, ash disposal costs, and reimbursement of capital costs for the construction of the facility.

The BCC project would be funded through an energy savings procurement contract under the U.S. Department of Energy. Fort Meade would directly contract with the design, operations and maintenance contractor for the project, Ameresco Federal Solutions, for a period of 20 years. The first 12 years of the project would be used to pay off the capital cost of the project (which would not exceed projected costs associated with the current haul and land application disposal method), after which Fort Meade would begin to realize a savings. The savings realized by implementation of the BCC in comparison with the current sludge disposal method would continue to increase yearly after the twelfth year.

Additionally, the risk of future escalations in the cost of hauling and land applying the sludge would be mitigated by implementing the proposed action, as its costs are much less variable than the current sludge disposal method. The BCC system could accommodate large annual increases in sludge volume due to Installation expansion, with little increase in operating costs.

1.3 LOCATION AND GENERAL DESCRIPTION OF THE AFFECTED AREA

Fort George G. Meade

Fort George G. Meade is a permanent United States Army Installation with the mission of providing base operations support for facilities and infrastructure, quality of life and protective services in support of Department of Defense (DoD) activities and Federal agencies. The major command for Fort Meade is the Military District of Washington (MDW).

Fort Meade encompasses approximately 5,415 acres in northwestern Anne Arundel County, Maryland, in the Chesapeake Bay watershed. Maryland (MD) Route 32 lies along the western part of the Post. Along the south, the Installation shares a border with the Patuxent Research Refuge. MD Route 175 borders Fort Meade on the east, and Interstate 295 borders the Installation on the north. The Little Patuxent River runs along the Installation's southwest corner. Two of the main tributaries to the Little Patuxent River, Midway Branch and Franklin Branch, flow south through the Installation.

Fort Meade, originally named Camp Meade for Major General George Gordon Meade, was authorized by Congress in 1917 as a training cantonment during World War I (WWI). During WWI, more than 100,000 troops passed through Camp Meade. A second cantonment area was added to the site in 1918. In 1928, Camp Meade was made a permanent installation and given the name Fort Leonard Wood, which was changed a year later, after much protest from Pennsylvania residents, to Fort George G. Meade.

Fort Meade became a training center during World War II, its ranges and other facilities used by more than 200 units and approximately 3,500,000 men between 1942 and 1946. Originally 9,349 acres in size, the installation was expanded in 1940 to 13,691 acres. Fort Meade continued its training mission until 1992 when, under Base Realignment and Closure (BRAC I) recommendations, the 8,100-acre range and training area south of MD Route 32 was transferred in ownership to the U.S. Fish and Wildlife Service. Reduced to its current size of just over 5,000 acres, the remaining installation acreage is actively being developed for military and tenant uses. Currently, there are over 78 tenant organizations at Fort Meade from all four services and many federal agencies, including the Defense Information School Headquarters, the U.S. Army Field Band, and the NSA.

Following BRAC 2005 recommendations and continued reorganization initiatives within the intelligence community, including the increase of Enhanced Use Lease (EUL) on Installation lands, Fort Meade's mission as a major federal administrative center is expanding and the Installation's need to accommodate additional tenants and activities is increasing. Fort Meade is expected to experience aggressive growth in the coming years, including an increase of approximately 15,000 new military, civilian and contractor personnel over the next 5 years, and, an increase of approximately 40,000 new personnel over the next 30 years, which is a 100% increase over current personnel levels (Bagnall, 2006).

Proposed Project Area

The existing WWTP is located on the southwest side of Fort Meade. The BCC would be located immediately northeast of the WWTP, on the west side of Maryland Route 32. The BCC would be located approximately 820 feet south of the NSA Complex and 2,560 feet north of Tipton Airfield (Figure 1-2).

The BCC would consist of two sludge receiving tanks and the main BCC building, which would house the centrifuge, dryer, combustion system and pollution control equipment.

The building would also include an enclosed control room, employee toilet room, break room, and tool/storage room above the control room. The BCC building would be approximately 2,600 square feet and constructed of metal. The proposed project includes the construction of a new paved driveway from the existing roadway, adjacent to the driveway of the WWTP, to allow access for BCC plant operation and maintenance. The facility would be enclosed within a new fence for increased security. The total footprint of disturbance for the project would be approximately 12,281 square feet.

1.4 SCOPE OF THE EA

This environmental assessment (EA) analyzes the environmental impacts that would result from the Proposed Action and its alternative, the No Action alternative. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 et seq.), the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500 through 1508) for implementing NEPA, the 32 CFR Part 651 [Army Regulation 200-2] Environmental Analysis of Army Actions, and the Army Reserves NEPA Handbook.

Key goals of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies, and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials.

The Purpose of an EA

An EA is a study conducted by a Federal agency to determine whether an action the agency is proposing to take would significantly affect any portion of the human or natural environment. The intent of the EA is to provide project planners and Federal decision-makers with relevant information on a Proposed Action's impacts on the environment.

If the EA finds that no significant impacts would result from the action, the agency can publish a Finding of No Significant Impact (FONSI), and can proceed with the action. If the EA finds that significant impacts would result from the action, then the agency must prepare and publish a detailed Environmental Impact Statement (EIS) to help it decide about proceeding with the action.

In this case, Fort Meade, through its higher commands (e.g. the Northeast Region Office), will decide whether to support the construction and operation of a BCC to dispose of the sludge generated from the Installation's WWTP.

This EA identifies, describes, and evaluates the potential environmental impacts that would result from the implementation of the proposed action and the no action alternative, taking into consideration possible cumulative impacts from other actions. As appropriate, the affected environment and environmental consequences of the action will

be described in both site-specific and regional contexts. In instances where mitigation measures may lessen any potentially adverse impacts, this EA identifies such measures that should be implemented to further minimize environmental impacts.

The following biophysical resources have been identified for study at Fort Meade: water resources (including wetlands, floodplains, coastal zones, and wild and scenic rivers), soil and land use resources, air quality, biological resources (including threatened and endangered species), cultural and historic resources, noise, hazardous materials and waste management, infrastructure and utilities, and socioeconomic resources.

Safety and health impacts are considered in this EA, but it has been assumed that the contractors will be responsible for compliance with the applicable Occupational Safety and Health Act (OSHA) regulations that concern occupational hazards and specifying appropriate protective measures for all employees. Safety and health impacts associated with air emissions from the proposed BCC are evaluated under the air quality resource section.

This EA identifies, documents, and evaluates the potential environmental impacts of the Proposed Action and the No Action alternative. The current activities included in the No-Action Alternative constitute the baseline for the analysis of effects. Fiscal Year 2005 (FY05) activities are used to establish the baseline conditions. However, where FY05 data were not available, the most current available information was used. The implementation of the No Action Alternative would not result in any change to this baseline. The existing conditions at Fort Meade are described in Chapter 3, Affected Environment. A team of environmental scientists, ecologists, and engineers have analyzed the potential effects associated with each alternative and have presented the results in Chapter 4, Environmental Consequences.

Applicable Regulatory Requirements

This EA complies with the NEPA, CEQ regulations, and DoD Instruction 4715.9. The EA also addresses all applicable laws and regulations, including but not limited to the following:

- National Historic Preservation Act (NHPA),
- Archeological Resources Protection Act (ARPA),
- The Noise Control Act of 1972, as amended,
- Clean Air Act (CAA),
- AFI 32-7040, Air Quality Compliance,
- Clean Water Act (CWA),
- Endangered Species Act (ESA),
- Pollution Prevention Act (PPA), and
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

Impact Topics Dismissed From Further Analysis

Environmental Justice/Protection of Children*:* Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, requires Federal agencies to identify and address any disproportionate adverse human health or environmental effects of its projects on minority or low-income populations. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, directs Federal agencies to "identify and assess environmental health risks and safety risks that may disproportionately affect children." Because no disproportionate impacts on children, minority, or low-income populations would result from the proposed action or the no action alternative, this topic was eliminated from further analysis in this EA.

Recreation: Though areas on Fort Meade itself, and adjacent land on the Patuxent Research Refuge, offer extensive recreation opportunities, including golfing, bicycling, jogging, wildlife viewing, photography, bird watching, and fishing and hunting, these activities generally do not occur within the proposed project area or in its immediate vicinity. The project area is located in a developed corridor between the existing WWTP and MD Route 32, and no recreation activities are currently known to occur at the site or its immediate environs. Additionally, impacts associated with the proposed project, including noise, air quality, and biological resources impacts, are not anticipated to have any impact on recreation activities offsite of the proposed project area. Because the proposed project would not appreciably diminish recreation opportunities or the quality of recreation activities in the vicinity of the project area, this topic is dismissed from further analysis.

1.5 ORGANIZATION OF THE EA

This Environmental Assessment is organized into seven chapters and one appendix containing agency consultation letters. Chapter 1 contains an introduction, the purpose and need for the action, the location of the Proposed Action, and the scope and organization of the document. Chapter 2 presents the alternatives, describing and comparing the Proposed Action and the No-Action Alternative in detail, and discussing the alternatives eliminated from consideration. Chapter 3 describes the affected environment of the project, both in a site specific and regional context. Chapter 4 analyzes the environmental consequences of the Proposed Action and the No-Action Alternatives, and includes a section analyzing cumulative impacts from the Proposed Action. Chapter 5 presents a glossary explaining the meaning of frequently used terms or words that have a particularly conceptual meaning in the document. Chapter 6 lists the source documents and the references that were used in the preparation of this EA. Finally, Chapter 7 provides a list of the preparers of this document, including those persons responsible for reviewing and commenting on the preliminary drafted version of this EA.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Council on Environmental Quality regulations (40 CFR 1508.9) require that Environmental Assessments describe and analyze the proposed action and alternatives in accordance with section 102(2)(E) of NEPA. This section describes the proposed project alternative and the no action alternative that are analyzed in detail in this EA. An explanation is also included for dismissing other alternatives from further consideration. It is important to note that the existing WWTP facility would continue to operate and process all of Fort Meade's wastewater, irrespective of the sludge disposal method selected.

2.1 PROPOSED ACTION

The Army currently owns and operates a 4.5 MGD capacity Advanced Wastewater Treatment Plant (WWTP) at Fort Meade. The WWTP collects an MGD of wastewater via approximately 305,270 feet of sewer pipe and nine wastewater collection system sewage lift stations.

Within the WWTP, the wastewater is held in primary settling tanks where phosphorus, suspended solids, biochemical oxygen demand (BOD), and scum are partially removed. The suspended solids material that settles out in the primary settling tanks is referred to as sludge, as this material contains on average only 5-6% solids. Much of the activated sludge accumulated in the nitrification settling tanks is reused in the nitrification reactors as return sludge. The remaining sludge, approximately 17,000 wet tons per year, is collected into holding tanks.

As regulated under the Clean Water Act, sludge must be disposed of by one of the following methods: drying and disposing in a landfill; transferred and used for land application; or destroyed in a combustion process. Fort Meade proposes to replace the current method of disposal, hauling the sludge offsite for land application, with a combustion process. Under the proposed action, a combustion center, hereafter referred to as the Biomass Conversion Center (BCC), would be constructed northeast of the existing WWTP and operated by a contractor for an initial term of 20 years for the purposes of sludge disposal. At the end of the initial 20-year contract term, the contract may be renewed, or, the Army may assume control and ownership over all operations.

The BCC would consist of two sludge receiving tanks, the main BCC building, which would house the centrifuge, dryer, combustion system and pollution control equipment, and the ash collection bins. The BCC building would include an enclosed control room, employee toilet room, break room, and tool/storage room above the control room. The BCC building would be approximately 2,600 square feet and constructed of metal. The project would also include the construction of a new paved driveway from the existing roadway, adjacent to the driveway of the WWTP, to allow access for BCC plant

operation and maintenance. The operation of the BCC would require wastewater, potable water, and various utility connections which would be extended from the existing WWTP to the BCC facility. BCC facility components are shown in Figure 2-1. The facility would be enclosed within a new fence for increased security. The total footprint of disturbance for the project would be approximately 12,281 square feet.

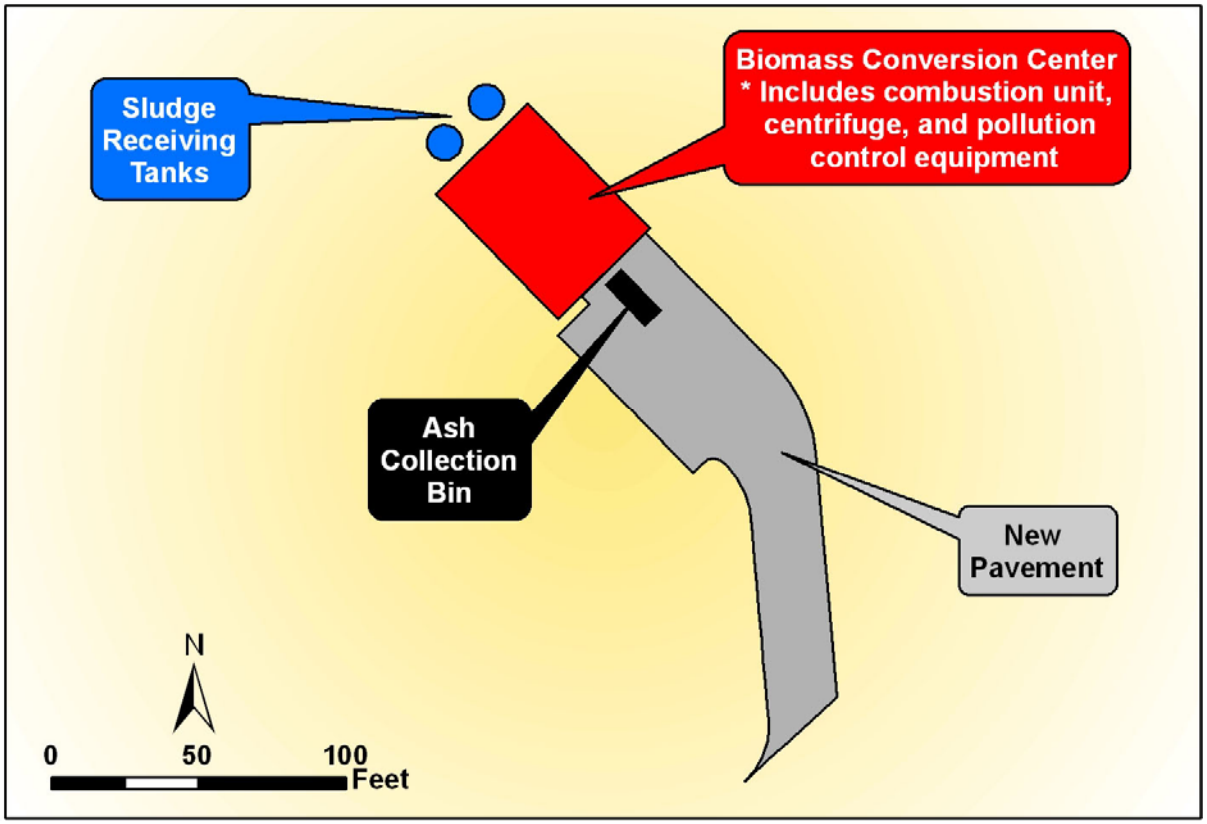

Figure 2-1. BCC Project Components

Sludge would be pumped from the WWTP holding tanks into the two sludge receiving tanks at the BCC. The new receiving tanks would be sized to hold a total of 20,000 gallons of sludge from the WWTP. The capacity of these receiving tanks is based on the approximate size required for one day of storage of sludge generated from the WWTP. Sludge would regularly be pumped into the receiving tanks and would be continually processed through a centrifuge during BCC operation to remove an average of 21,000 gallons per day of wastewater from the stream, which would be sent back to the WWTP for processing.

The centrifuge system would include a polymer injection system to insure the adequate separation of the solids from the water. The polymer to be used is an acrylamide based emulsion which would increase the separation efficiency of the centrifuge and the resulting solids concentration. Trace amounts of the polymer would be present in each fraction of wastewater. As is common practice, the separated wastewater from the centrifuge would be returned to the sanitary sewer or to the headwork of the WWTP, and

would not impact the quality of the effluent. The sludge remaining at the BCC would have a solids content of approximately 25%, and would then be augured into a tray dryer.

In the tray dryer, the concentrated sludge would be spread on circular trays that provide a large surface area for the sludge to cover. The material is dried as it passes from one tray down to the next. The primary heat source for the dryer would be the heat recovered from the combustion process; a gas heater will also be provided to use for back-up if the temperature of the heated air falls and to use during system startup.

Dried sludge would leave the bottom of the dryer unit and then be conveyed by a series of screw augers to the metering bin of the combustion system. The system selected in this design is the Challenger Combustion System™, which is used for the combustion of solid waste and designed to optimize energy recovery and minimize air emissions. The combustor of the system is designed to effectively use primary, secondary, and tertiary air to ensure the complete combustion of the biomass and reduce toxic air pollutant emissions. The appropriate combustion temperature is maintained by adjusting fuel feed, fan speed, and air intake. A small natural gas duct burner would also be installed for use during startup or as a back-up for the system. The natural gas burner would include a burner management system to safely control natural gas firing.

In order to recover the heat from the exhaust stream to heat air which is recycled to the dryer and also provide a source of combustion air for the combustor, a heat exchanger would be installed in the BCC. During the winter season, the heated air would also be used to provide heat to the building. Motor operated dampers would be installed in the duct to control the distribution of the heated air.

Downstream of the combustion heat exchanger, the exhaust gas would be designed to go through a cyclone and then through a wet scrubber and Wet Electrostatic Precipitator (WESP). The three units would provide a combined reduction of 99% of particulate matter emissions. The WESP would be directly connected to an air stack and would be the only air emission source to the outside environment. The scrubber/WESP pollution abatement system is the recommended and accepted arrangement by the USEPA for the removal of particulate matter and hazardous air pollutants emitted during sludge combustion.

The combustor unit would also be equipped with a self cleaning auto ash system, which would transport the ash generated during combustion activities out of the unit and into an ash hopper located outside of the BCC building. The ash collectors would be covered to prevent dust from escaping. The ash hopper would be emptied by truck once per week, for a total of 52 loads per year, and the ash would be sold or donated whenever possible for use as a fertilizer or industrial byproduct. When recycling/reuse of the ash is not possible, it would be delivered to a local landfill as a non hazardous waste source.

The BCC would initially be designed to process the wastewater load received by the WWTP at present-day conditions, up to 1,550 tons of dry sludge per year. This would require the BCC to dry and combust 564 lbs of dry sludge per hour throughout a 5-day

week. The BCC would be staffed during the daytime and remotely operated during the evening hours. Over the weekends and holidays, the sludge would be stored in the receiving tanks located outside of the building. The system could be upgraded as needed to operate continuously in a 24 hr period for 7-day weeks.

2.2 NO ACTION ALTERNATIVE

Under the No-Action Alternative, the proposed BCC would not be installed. Sludge would continue to be collected from the primary settling tanks, stabilized with lime, and stored for pickup as necessary. The sludge would be stored in two bins outside of the facility, and the contractor would continue to transfer the sludge into trucks for offsite disposal on a daily basis, Monday through Friday.

Figure 2-2. No Action: Hauling of Sludge from WWTP

Fort Meade would remain under an agreement with a Small Business Administration (SBA) certified 8(a) contractor to haul the sludge off site to be used for land application wherever land is available, most probably in regions of Maryland and Virginia. At times where no land is available, or when weather conditions prohibit the land application of sludge (during periods of precipitation or frost), Fort Meade would have to bear the cost of transporting and disposing of the sludge at a wastewater treatment plant capable of processing the material. Currently, the WWTP used for these purposes is located in Pennsylvania.

From 2003 to 2005, approximately 17,000 tons of wet sludge (equivalent to 1,100 tons of dry sludge) was removed annually by truck from the WWTP (Table 2-1). Approximately 725 truck loads of sludge are hauled off in 6,000 gallon capacity trucks from the WWTP each year, and each haul was approximately 215 miles round trip (Williams, 2006).

Table 2-1. Annual Truck Traffic for Sludge Hauling

	2003	2004	2005
Number of Loads Hauled	749	687	661
Number of Days Hauled	198	172	173

The population of Fort Meade is projected to grow 100% over the next 30 years (Bagnall, 2006). If the BCC is not constructed, the amount of wastewater treated by the WWTP, the amount of sludge produced, and the number of truck hauls, would increase proportionally to the growth in the Installation's population. Figure 2-3 shows the estimated future sludge generation due to the expected population increase over the next 15 years.

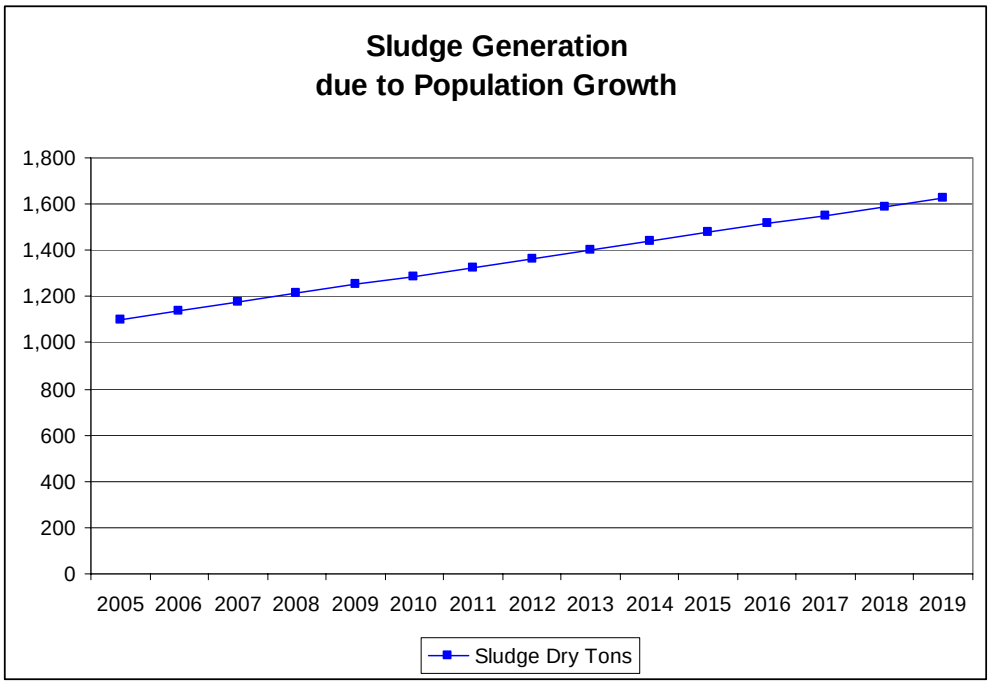

Figure 2-3. Future Sludge Generation
Source: Ameresco, 2006

The demands on land for disposal, and on fuel for increased hauling trips, will increase in proportion to increases in the projected amounts of sludge generated in future years. There is uncertainty in both the future amount of land that will be available, and the costs of land disposal and fuel, associated with the No Action alternative.

2.3 COMPARISON OF ALTERNATIVES

Table 2-2 briefly summarizes the environmental effects of the two alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives, significant issues, and impact topics. Chapter 4 discusses the environmental consequences of the proposed alternatives in detail.

Table 2-2. Comparison of Potential Impacts of the Alternatives

Environmental Resource/ Component	Proposed Action	No Action
Water Resources	*There are no wetlands or floodplains on site; the site does lie within the MD coastal zone.* • Localized, negligible to minor, adverse impacts on water quality due to risk of spills and increased stormwater runoff during construction and operation activities • No impacts on water discharged from the WWTP from operation of the BCC	• No impacts on water resources are anticipated to occur at the project site; though incremental contributions to watershed impairment from continued sludge application will occur offsite
Soils and Land Use	*The site is relatively level and fairly disturbed with soils exhibiting low to moderate erosion susceptibility.* • Localized, negligible to minor, adverse impacts on soils due to grading and compaction during site preparation and construction activities	• No impacts on soils or land use are anticipated to occur at the project site; though incremental contributions to soil productivity and texture from continued sludge application will occur offsite
Air Quality	*Anne Arundel County is in nonattainment for air quality related to particulate matter and ozone.* • Temporary, minor, adverse impacts on air quality due to equipment emissions during the construction phase from emissions and fugitive dust • Long-term, minor adverse impacts on air quality in the region resulting from operational emissions contributing incremental amounts of PM and ozone precursors to a larger (regional) air quality problem • Long-term, negligible impacts on air quality from trucking emissions associated with the disposal of 1 truckload of ash per week	• No changes in current air quality conditions around the project area; though air quality impacts associated with trucking activities (currently 13-14 truckloads per week) will increase as Installation grows and more sludge is produced
Biological Resources	*The site is a fairly disturbed grassy area populated by a few patches of small trees; no T/E species on the site.* • Negligible, temporary, localized, adverse impacts on vegetation during the construction/clearing activities • Negligible to minor, localized disturbance of wildlife during construction and operation of BCC • Negligible impacts to Threatened, Endangered, or Sensitive species (consultations pending)	• No impacts to biological resources are anticipated
Cultural and	*No known cultural resources in area (SHPO*	• No impacts to cultural or

Historic Resources	*consultation pending)– if cultural resources are discovered during construction, must halt operations.* • Negligible impacts to cultural and historic resources are anticipated	historic resources are anticipated
Noise	• Temporary, minor, adverse noise impacts during construction activities • Negligible to minor increase in noise impacts during operation of the BCC; minor decrease in noise levels related to significant decrease in hauling/trucking activities	• No changes in noise levels around the project area; though noise levels associated with trucking activities will increase as Installation grows
Hazardous Materials and Waste Management	• Negligible adverse impacts on solid waste management related to construction and operation activities are anticipated • Negligible, adverse impacts to hazardous materials management from the utilization of limited amounts of solvents, degreasers, and lubricants during construction and operation activities	• No impacts on waste or hazardous materials management are anticipated
Infrastructure and Utilities	*Roads and airfields located in close proximity to site; adequate utility connections are all located immediately adjacent to the site.* • Temporary, negligible to minor impacts associated with increased vehicle traffic in area during construction • Temporary, minor impacts potential to damage or interrupt utility lines during utility line connection activities • Minor long-term increases in demand for utilities during operation • Negligible long-term impacts on transportation and waste associated with disposing of 1 truckload of ash per week	• No potential to damage or disrupt utility lines in the area • No changes in demand for utilities and public services • Minor long-term impacts on transportation from the continued rate (13-14 truckloads/week), and potential increase in rate, of current sludge disposal methods
Socioeconomics	*Cost of current sludge disposal method is high and cost escalation risks exist for the future.* • Temporary, minor to moderate, localized, beneficial impact due to the creation of employment from construction and employment • Short-term, minor to moderate, adverse impacts on hauling contractor and farmers due to loss of contract and fertilizer, respectively • Long-term, moderate to major beneficial economic impacts to Fort Meade due to overall cost savings of operation	• No changes in regional employment • Long-term, minor to moderate, adverse impacts to Fort Meade from high costs and economic risks

2.4 ALTERNATIVES CONSIDERED AND DISMISSED

CEQ regulations for implementing NEPA require that Federal agencies explore and objectively evaluate all reasonable alternatives to a proposed action, and to briefly discuss the rationale for eliminating any alternatives that are not considered in detail. Two alternative sludge disposal methods were considered by Fort Meade Environmental Division staff in 2005, in addition to combustion via a BCC (the Proposed Action), but were dismissed from further analysis. These alternatives are described below.

Drying & Land Application
This alternative would require installing equipment that would dry the sludge through either a mechanical process such as a screw press or through a thermal process. The capital cost for this type of this system would be approximately $1.1M (Butler, 2005). The drying process would result in sludge with a higher percentage of solids and thereby reduce the annual sludge disposal requirement by 25%. This dryer sludge would have different hauling rates and costs of land application than the current operation (the No Action). Also, additional manpower and utility costs would be required to operate the system. This option would somewhat mitigate future cost escalations in that hauling costs should be reduced, but the risk of increased land application charges and land availability remains unchanged. This option would still require hauling the sludge by truck to land application sites. This option was not considered a reasonable, cost-effective alternative to the current system because the amount of sludge to be hauled from the facility for land application will continue to increase in light of the anticipated population growth at Fort Meade.

Anaerobic Digestion
This process facilitates the digestion of sludge by introducing microbes into an oxygen deprived environment. Methane is produced as a byproduct and can be put to productive use for heating or electrical needs. However, these systems are typically used only at large facilities and are capital intensive. In addition, it would be necessary to basically redesign the entire wastewater treatment plant to accommodate the installation of an anaerobic digestor (Butler, 2005). Therefore, this option was not considered to be a reasonable, cost-effective alternative, and it is not evaluated further in this EA.

Based on best available technology and project economics, the best solution for alternative sludge disposal at Fort Meade was determined to be the combustion alternative.

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 WATER RESOURCES

The Fort Meade WWTP has a capacity to process and treat 4.5 MGD of wastewater, but currently treats between 2 and 3 MGD. The 10-year average flow to the plant is 2.3 MGD, with a maximum instantaneous flow of 12 MGD (FGGM, 2004). The maximum flow to the plant typically occurs during wet weather. During the treatment process, the wastewater flows into two primary settling tanks where sludge settles out; a specific amount of the sludge is returned to the nitrification reactors as a further part of the wastewater treatment process and the remainder of the sludge is stabilized, and then transported to agricultural fields in Maryland and Virginia for land application.

Once treatment of the wastewater is complete, the majority of the treated water is discharged into the Little Patuxent River, just downstream of the low water dam and north of the Simonds Bridge (Versar, 2005). During the summer months, an average of 133,000 gallons of treated water per day is also discharged to the two Fort Meade golf courses for irrigation (USDOE, 2002). The primary WWTP discharge point in the Little Patuxent River is approximately 12 miles upstream from where the Little Patuxent River flows into the Patuxent River, and it is approximately 43 miles upstream of where the Rivers empty into the Chesapeake Bay. The discharged water is required to meet specific parameters in order to be considered in compliance with its MDE permit. These include, but are not limited to, a nitrogen load goal of 49,680 lbs/year, a total phosphorous weekly average of 1.5 mg/l, a minimum dissolved oxygen level of 5.0 mg/l, and a pH range of 6.5-8.5, as well as BOD and fecal coliform levels.

The Fort Meade WWTP operates under a National Pollutant Discharge Elimination System (NPDES) Wastewater Treatment Plant Permit, which authorizes and regulates the plant’s water discharge to the Little Patuxent River. Along with this primary permit, the WWTP also operates under two Installation wide permits; a NPDES Stormwater Discharge Permit which allows the discharge of stormwater from industrial facilities, and a NPDES General Discharge Permit which allows discharge of stormwater from maintenance and repair activities. Each of these three permits is issued by MDE (Versar, 2005). The Fort Meade WWTP has historically and is currently in compliance with all of its discharge standards and permit requirements (CBF, 2003).

The Fort Meade property lies within the Chesapeake Bay watershed, which is one of the nation's largest and most productive ecosystems. Its watershed includes six states and the District of Columbia and drains 64,000 square miles of land (CBF, date unknown). The Chesapeake Bay has been drastically impacted by agricultural and urban runoff, to the extent where areas of the Bay are considered dead. Both farming operations and wastewater treatment plants are major contributors to Chesapeake Bay contamination. Nitrogen and phosphorous from both sources runoff or are discharged into rivers and streams and eventually reach the Bay (SED, 2005, CBF, 2005a). Eutrophication then occurs as excessive algal growth results from an increase in nutrients in the Bay. This

makes it difficult or impossible for aquatic species such as fish and vegetation to survive as it causes an increase in turbidity and dissolved oxygen depletion (USEPA, 2000b, USGS, date unknown). Pollution from WWTPs results when discharged waste water is not in compliance with local, state or federal standards. This is common in the Bay watershed, but, as stated earlier, the Fort Meade WWTP has consistently been in compliance with all of its operational permits.

Figure 3.1 Little Patuxent River
(photo courtesy of USEPA, 2006)

The proposed project site is located within the Little Patuxent River drainage. The Little Patuxent River runs along the southwest corner of the existing WWTP and is the closest water body to the proposed project site. The Little Patuxent is one of the larger tributaries of the Patuxent River which flows in a southeast direction between Baltimore, MD and Washington D.C., before draining into the Chesapeake Bay. According to the USGS (2006), the Little Patuxent has an average annual flow of 80 MGD. Rivers in this region are generally experiencing the same water quality impacts and fluctuations that the overall Chesapeake Bay is experiencing. Runoff from both agricultural and urban land is polluting many rivers and streams in the area (CBF, 2005a). The Little Patuxent River is on the USEPA's 303(d) list for Impaired Waters. In 1996, this river was listed as being impaired with heavy metals, nutrients (such as nitrogen and phosphorous), and sediments. In 2006, the river is being listed as impaired with biological contaminants, nutrients, and sediments (MDE, 2006a).

Wild and Scenic Rivers

There are no federally listed Wild and Scenic Rivers in Maryland (NWSRS, date unknown). The Patuxent River is listed on the State of Maryland's Wild and Scenic Rivers List, however, this river is not in the vicinity of the project site (MDNR, 2006).

Wetlands and Floodplains

The Chesapeake Bay watershed region supports some of the most ecologically and commercially important wetland areas in the United States (Versar, 2005). As seen in Figure 3-2, there are a variety of palustrine wetlands near the project site adjacent to the Little Patuxent River, but there are no wetlands in the immediate area of the proposed project.

Palustrine wetlands are freshwater areas, situated on the floodplains bordering rivers and streams, fringing the shorelines of lakes and ponds, and filling isolated depressions and

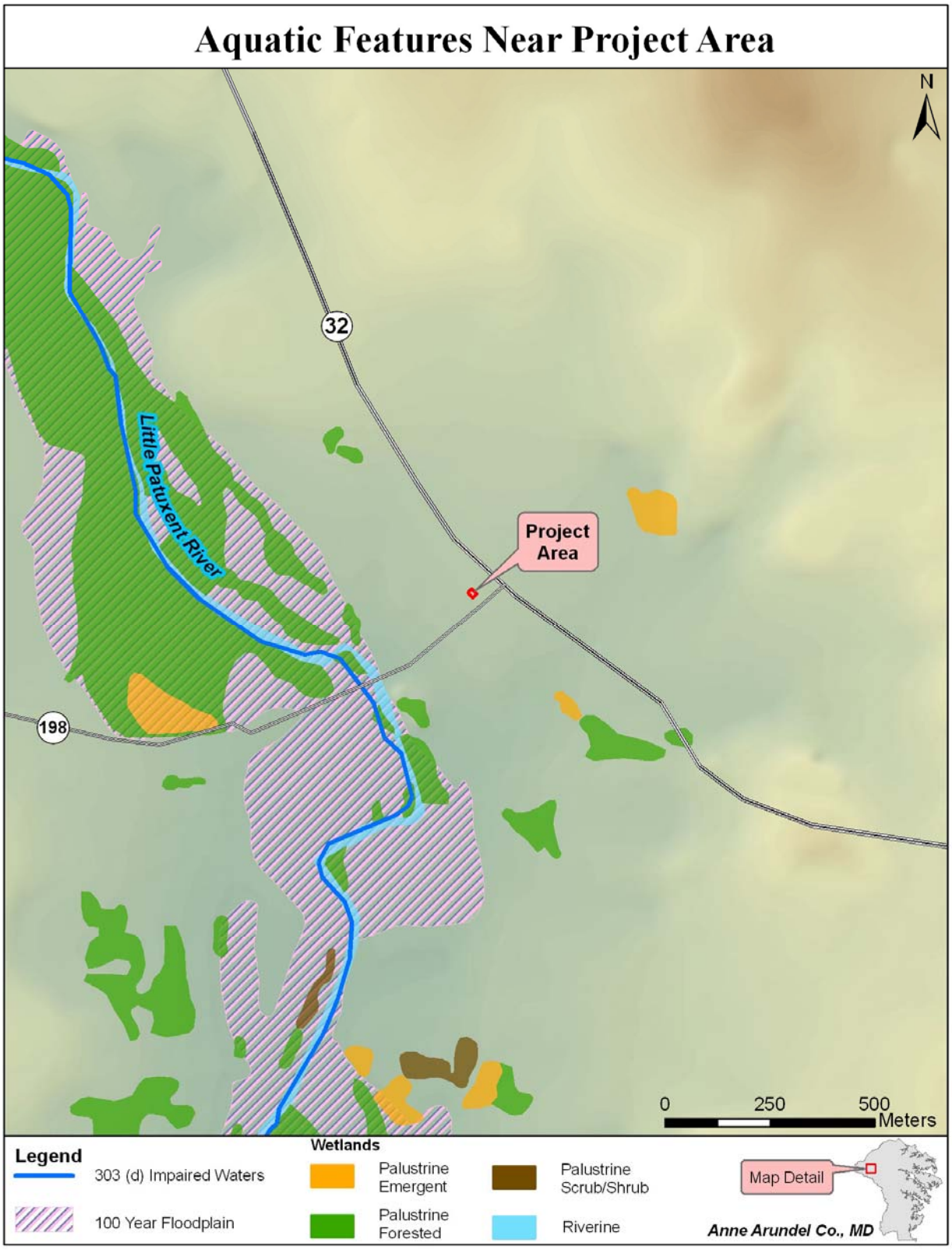

Figure 3-2. Aquatic Features Map

covering broad flat areas at or near sea level. Palustrine wetlands are typically distinguished from riverine and lacustrine systems by the presence of very dense covers of trees, shrubs, or emergent plants. They provide cover and forage for wildlife traveling between upland and aquatic habitats (Mitsch and Gosselink, 2000)

Figure 3-2 also illustrates the 100-year floodplain along the Little Patuxent River. The proposed project site is approximately 1000 feet away from both the closest wetlands and floodplain.

Coastal Zone

Fort Meade is located entirely within Anne Arundel County, which has 447 linear miles of tidal shoreline, and major Chesapeake Bay tributaries that penetrate 8-10 miles inland (Versar, 2005). Because of its location, all of Anne Arundel County, including the proposed project site, lies within the Maryland Coastal Zone.

3.2 SOILS AND LAND USE

The topography around Fort Meade is gently rolling, with elevations ranging from just over 300 feet above Mean Sea Level (MSL) to 97 feet above MSL. The proposed project site is located at approximately 120 feet above MSL. The low elevation point occurs along the Little Patuxent River. The alluvium that underlies all of the rivers and wetlands in the project site area consists of interbedded sand, silt, and clay with gravel inclusions. Within the vicinity of the proposed project site are a variety of soil types as well as urban land, cut and fill areas, and gravel and borrow pits. These latter areas have been altered so severely that their association with a soil series is impossible to determine. Most of the soils in the area are on a 5 to 15% slope (Versar, 2005).

Soils

Figure 3-3 illustrates soils in and around the proposed project site. These soils include the Fallsington Sandy loam, the Woodstown loam, the Udorthents, the Downer-Hammonton complex, and the Zekiah-Issue complex. The Fallsington Sandy loam is a poorly-drained and a low erodibility soil; the Woodstown loam is moderately well-drained with a low erodibility; the Downer-Hammton complex is well-drained with a moderate erodibility; and the Zekiah-Issue complex is poorly drained with a moderate erodibility. The proposed project site lies completely on Udorthents soils, and these are considered well-drained soils with a low erodibility (USDA, 2005).

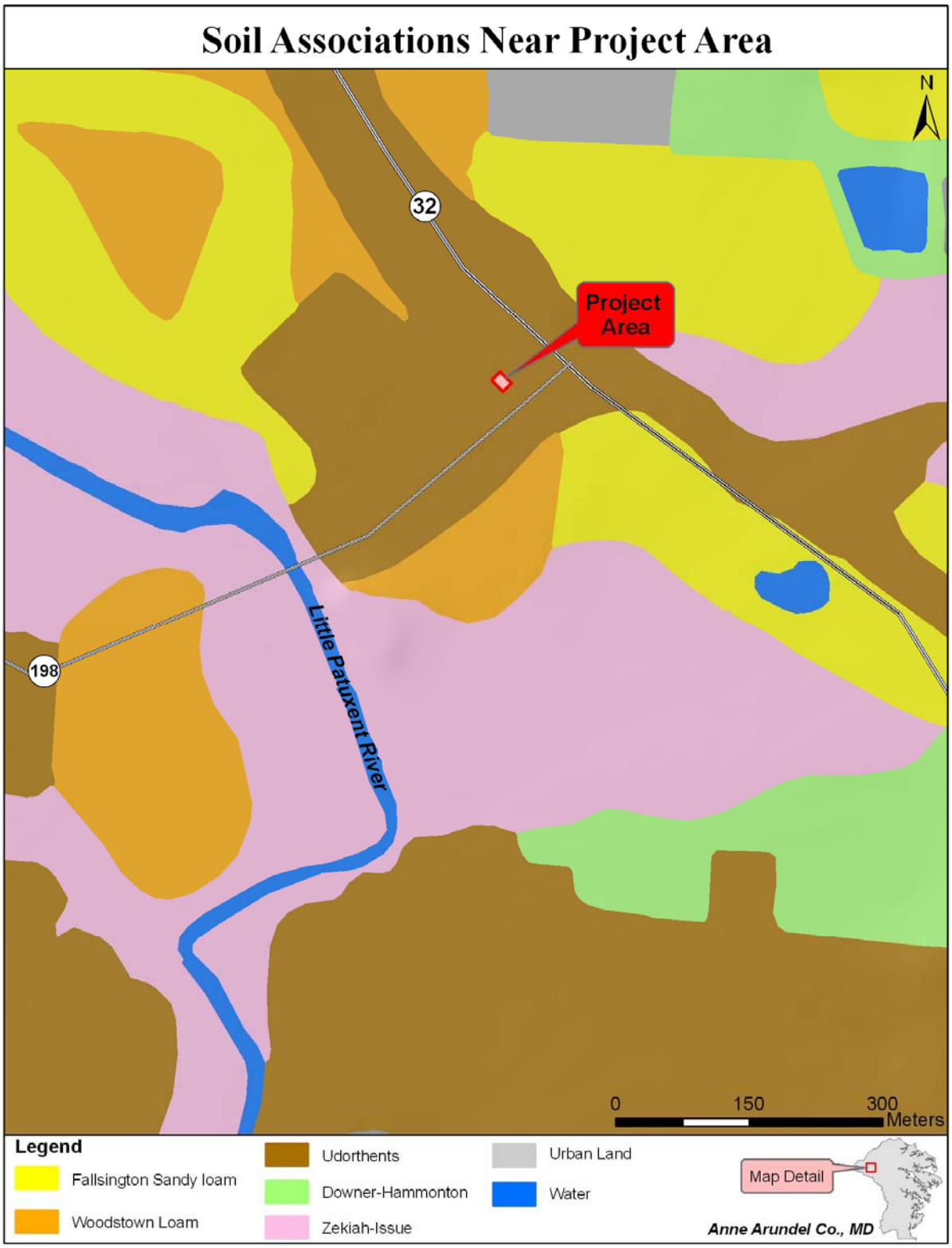

Figure 3-3. Soils Map

Scattered pockets of land that contain soils indicative of prime farmland do exist within Fort Meade boundaries, but no agricultural activities are currently taking place in the area. These soils include the Downer-Hammonton Complex and the Fallsington Sandy Loam, both of which occur near the WWTP. The Udorthents Unit is not classified as Prime and Unique Farmland, or Farmland of Statewide Importance (USDA, 2005).

Prime and Unique Farmland

As defined by the Natural Resources Conservation Service (NRCS), Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agriculture crops with minimum inputs of fuel, fertilizer, pesticides and labor, without intolerable soil erosion, as determined by the Secretary (of the Interior). Unique Farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, as determined by the Secretary (USDA, 2001).

All of the sludge from the Fort Meade WWTP is currently being land applied in Maryland and Virginia. Counties that have farms receiving sludge include St. Mary's County, MD – which receives about 7% of land applied sludge in Maryland – Charles County, MD, and Westmoreland County, VA. (Freij, 2006; Williams, 2006). Sludge is typically applied to crops by either being sprayed or spread on the soil surface or tilled into the fields or lawns (USEPA, 1993). Some of the watersheds in these counties are listed as being highly susceptible to erosion and having a high percentage of impervious surfaces. This can lead to a higher ability for contaminated runoff to reach the Chesapeake Bay (MDNR, 2000).

Land Use

Fort Meade is surrounded to the north, west, and east by residential areas ranging from low (2 to 5 dwellings per acre) to high (10 or more dwellings per acre) density, and a mix of commercial and industrial developments. Areas along transportation corridors such as MD Routes 198, 32, and 175 are moderately developed. Much of this development is associated with the Installation (Versar, 2005).

The project site is located immediately northeast of the existing WWTP, on the west side of Maryland Route 32. The project site is bordered by a relatively narrow stand of trees located between the highway right-of-way and the WWTP. Grasses cover the project site itself, and no structures are located on the site. The area has been heavily impacted by development.

The Patuxent Research Refuge lies to the south of Tipton Airfield, which in turn is located just over 2,500 feet southeast of the WWTP. The bulk of the refuge lies south-southwest of the WWTP. The refuge was established in 1936 and is the Nation's only National Wildlife Refuge established to support wildlife research. Today most of the research on the refuge is conducted by the US Geological Survey (USGS) through the Patuxent Wildlife Research Center (Verser, 2005; USFWS, 2005). Anne Arundel County is more than 50% developed, with 17% of this development being non-residential (commercial, governmental, institutional, and roads).

3.3 AIR QUALITY

The US Environmental Protection Agency regulates six air pollutants for which standards for safe levels of exposure have been set under the Clean Air Act of 1990 (CAA): ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter (PM), sulfur dioxide (SO_2) and lead (Pb). These pollutants are referred to as "criteria pollutants." Hazardous and other toxic air pollutants, including mercury (Hg), are regulated under the CAA Amendments of 1990. In addition to the six criteria pollutants outlined in the CAA, several other substances raise concerns with regard to air quality. These substances include metals, nitrogen oxides and volatile organic compounds (VOCs). Several metals as well as total hydrocarbons are regulated by the USEPA under CFR Part 503 Rule as emissions from biosolids incineration plants (NBP, 2005).

For each criteria pollutant, the maximum concentration above which adverse effects on human health may occur is called a National Ambient Air Quality Standard (NAAQS). Attainment means that the air quality in a particular area is less than the NAAQS. Non-attainment means that the air quality is at or above the NAAQS in an area. Non-attainment designations are further categorized as severe, serious, or marginal non-attainment. Under the USEPA's General Conformity Rule, Federal agencies are required to prepare a written conformity analysis and determination for proposed activities where the total of direct and indirect emissions of a non-attainment or maintenance criteria pollutant caused by the activity will exceed the threshold emission levels specified under the CAA.

The proposed site of the BCC is located in Anne Arundel County. February 2006 data indicate that Anne Arundel County is in severe non-attainment for both particulate matter (PM) 2.5 and 1- and 8-hour ozone (USEPA, 2006). Anne Arundel has been in non-attainment of these standards since 1995. Furthermore, Anne Arundel County ranks as the top geographical emitter of PM 2.5, sulfur dioxide, and nitrogen oxides in the State of Maryland (Scorecard, 2005). This is primarily due to the heavily industrialized areas in the very northern part of the County which border Baltimore County. Additionally, both the Brandon Shores and Herbert A. Wagner coal-burning power plants are located within Anne Arundel County, and are the largest stationary source of emissions in the area (Scorecard, 2005).

Under the CAA, each state is required to complete a State Implementation Plan (SIP) in order to detail its plans and programs for decreasing air pollution and adhering to NAAQS (NPS, 2005). In Maryland, the MDE is responsible for each SIP as well as general air quality permitting.

3.3.1 Class I and II Areas

Federal Mandatory Class I Areas, as defined in the CAA, are national parks over 6,000 acres (2,428 ha), national wilderness areas and national memorial parks over 5,000 acres (2,023 ha), and international parks that were in existence as of August 7, 1977. There are no Class I Areas near the proposed project site. The closest Class I areas are the

Shenandoah National Park in Virginia, the Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and the James River Face Wilderness Area in Virginia (USEPA, 2006).

Class II Areas are areas of the country protected under the CAA, but identified for somewhat less stringent protection from air pollution damage than a class I area, except in specified cases (NPS, 2005). As mentioned above, air quality is described by the concentration of various pollutants in the atmosphere. The significance of a pollutant concentration is determined by comparing the concentration in the atmosphere to applicable national and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The USEPA has established the NAAQS listed in Table 3-1. Anne Arundel County and the surrounding areas are considered Class II Air Quality Areas.

3.3.2 Criteria Pollutants

Ozone:
O_3 is a strong photochemical oxidant that is formed when NO reacts with volatile organic compounds (VOCs, also referred to as hydrocarbons (HC)) and oxygen in the presence of sunlight. Ozone is considered a secondary pollutant because it is not directly emitted from pollution sources but is formed in the ambient air.

Ozone exposure can lead to eye irritation at concentrations above 0.1 parts per million (ppm). Coughing and chest discomfort are caused at concentrations of 0.3 ppm (Davis and Cornwell, 1998). Ozone impairs lung function and reduces resistance to colds and diseases such as pneumonia. Ozone plays a role in bronchitis, emphysema, asthma, and heart disease. With long-term exposure, ozone may cause permanent lung damage. In addition, high levels of ozone have been documented to damage certain trees, plants, and crops.

Carbon Monoxide:
CO is a colorless, odorless gas formed during combustion. CO is a product of incomplete combustion of carbon and is emitted during nearly all combustion activities. CO reacts with hemoglobin in the blood to form carboxyhemoglobin, effectively depriving the body of oxygen. Oxygen deprivation impairs perception and thinking, slows reflexes and causes drowsiness. Prolonged exposure to high levels of CO, particularly in those who have heart and circulatory ailments, can cause unconsciousness or even death.

Nitrogen Dioxide:
NO_2 is a poisonous gas that is produced when nitrogen oxide is a byproduct of sufficiently high-temperature combustion. NO_2 is harmful to lungs, and irritates bronchial and respiratory systems. These symptoms are more prominent in asthmatic patients. NO_2 is also a precursor to ozone.

Particulate Matter:

PM is a mixture of small solid and liquid particles that are suspended in the atmosphere. Smoke and fly ash contain PM in a wide range of sizes, from 0.05 to 200 um in diameter. As a basis of comparison, the width of a human hair ranges between 20 and 100 um. PM is released through factory and utility smokestacks, vehicle exhaust, wood burning, construction activity, agriculture, and natural sources like volcanoes. PM also can form in the atmosphere when oxidized sulfur or nitrogen reacts to form aerosol particles. Such aerosols are called secondary fine particles, adding to PM levels in the atmosphere (DOE, 2003b). PM is regulated based on its size, with $PM_{2.5}$ regulated separately from PM_{10}. $PM_{2.5}$ particles, which can be carried much farther and higher than larger particles (like PM_{10}), are more likely to carry heavy metals and cancer-causing organic compounds into the alveoli, the deepest and most susceptible part of the lungs, and thus are more stringently regulated (Davis and Cornwell, 1998). In addition to being regulated through particle size, PM is also sampled as total PM (the sum of various-sized particles).

Micron or Micrometer

The micron or micrometer (um) is a unit of length in the metric system equal to one-thousandth (10^{-3}) of a millimeter or one-millionth (10^{-6}) of a meter. The abbreviation of the micron is μm.

Sulfur Dioxide:

SO_2 is formed through the oxidation of bound sulfur found in all organic fuels used by humans, including oil, coal, natural gas, peat, and wood. Sulfur dioxide also is released from volcanoes and decaying plants. As with nitrogen oxides, sulfur dioxide is a precursor to acid rain. Oxidized sulfur reacts with H_2O to form sulfuric acid (H_2SO_4). Sulfuric acid then falls to the earth in the form of rain, snow, or fog. SO_2 also reacts with other atmospheric chemicals to form tiny sulfate particles, which contribute to PM concentrations. Such particles can gather in the lungs and cause respiratory symptoms and disease, difficulty in breathing, and premature death (USEPA, 2003b). Furthermore, these aerosols are a major cause of the visibility impairment that interferes with views of scenery in national parks and mountain ranges like the Appalachians.

Lead:

Lead (Pb) is a highly toxic metal that is emitted by industrial processes (including smelters and power plants) and resides in the atmosphere as particulate matter. Pb affects the brain, nerves, heart, and blood, and can lead to seizures, mental retardation, behavioral disorders, memory problems, kidney and liver damage, heart disease, anemia and mood changes. Infants and young children are especially vulnerable to lead exposure (USEPA 2003c).

Table 3-1. National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm (10 mg/m3)	8-hour	None
	35 ppm (40 mg/m3)	1-hour	None
Lead	1.5 µg/m3	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m3)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM10)	50 µg/m3	Annual (Mean)	Same as Primary
	150 ug/m3	24-hour	
Particulate Matter (PM2.5)	15.0 µg/m3	Annual (Mean)	Same as Primary
	65 ug/m3	24-hour	
Ozone	0.08 ppm	8-hour	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Mean)	-------
	0.14 ppm	24-hour	-------
	-------	3-hour	0.5 ppm (1300 ug/m3)

Source: USEPA, 2006f

3.3.3 Additional Monitored Substances (Part 503 Rule)

Mercury:
A toxic heavy metal that is a byproduct of the combustion of fossil fuels, especially coal. Mercury can accumulate in the environment and is highly toxic to humans and animals if inhaled or swallowed. Exposure can permanently damage the brain, kidneys, and fetuses (USEPA, 2003d). Other metals monitored include arsenic, cadmium, chromium, nickel, and beryllium.

Nitrogen oxides (NO_x):
Nitrogen oxides are formed during combustion, either by the oxidation of nitrogen in fuel or by the reaction of atmospheric nitrogen (typical air content is about 80 percent nitrogen or N_2) and oxygen (O_2) in the high temperatures of combustion. A small portion of NOx from combustion is emitted as NO_2. Most NOx emissions from combustion are NO, some of which eventually oxides to NO_2 in the ambient air. State and federal ambient air quality standards for NOx are based on NO_2.

Nitrogen oxides are one of the precursors to acid rain. Over time, NO in the atmosphere can react with water (H_2O) to form nitric acid (HNO_3). Nitric acid can form fine particles that remain suspended in the air or fall to the earth in the form of rain, snow, or fog. Acid rain (sometimes called acid precipitation or deposition) can cause soils, lakes and streams to become acidic, adversely affecting the ecosystem. Additionally, acid rain causes deterioration of cars, buildings, and irreplaceable historic monuments.

Nitrogen oxides also contribute to PM concentrations in the atmosphere, as NO_x particles react with ammonia, moisture, and related particles. Exposure to nitrogen oxides also can result in coughing and irritation of the respiratory tract, or in more severe cases, in difficulty breathing, damage to lung tissue, or premature death (USEPA, 2003a). Nitrous oxide (N_2O) is also a potent greenhouse gas. Greenhouse gases are discussed further in Section 3.3.6.

Volatile Organic Compounds:
Also known as hydrocarbons, VOCs are liquids or solids that contain organic carbon, and that readily vaporize. VOCs participate in the smog reaction and also contribute to the formation of secondary pollutants in the atmosphere, including ozone. VOCs are created when fuels or organic waste materials are burned. Most hydrocarbons are presumed to be VOCs in the regulatory context, unless otherwise specified by the USEPA. VOCs can be broken down into methane and non-methane organics. This is a way to distinguish methane which is an extremely efficient greenhouse gas from other regulated, potential carcinogens such as benzene, toluene, and xylene.

Methane:
Methane (CH_4) also is a greenhouse gas that traps heat in the atmosphere. A molecule of methane is estimated to be 21 times more potent as a greenhouse gas than a molecule of carbon dioxide. Over the last two centuries, methane's concentration in the atmosphere has more than doubled due to increasing methane emissions from human activities, including placing municipal solid waste in landfills, producing natural gas and petroleum, mining coal, burning fossil fuels, and as a byproduct of large scale cattle and domestic animal operations (USEPA, 2003d).

Hazardous Air Pollutants (HAPS):
Section 112 of the Clean Air Act identifies and establishes the regulations of Hazardous Air Pollutants (HAPs). HAPs are substances that are known or suspected to cause cancer or other serious health or environmental effects. These health effects include immune system damage, neurological, reproductive, developmental, and respiratory problems. Animals can experience similar health problems if HAPs are deposited in ecosystems and magnified up the food chain. There are currently 188 HAPs, including benzene, heavy metals, dioxins, asbestos, and toluene (USEPA, 2006).

3.4 BIOLOGICAL RESOURCES

Fort Meade lies within the heavily developed and populated Baltimore-Washington metropolitan area. The site of the proposed action is nestled within a 100 meter (328 feet) stretch of land between the existing WWTP on the western edge of the Installation and MD Route 32. Much of the area west of the highway is forested. The National Security Agency is across the highway to the north, and Tipton Airfield is less than a mile to the south.

The proposed site is approximately 350 meters (1148 feet) northeast of the Little Patuxent River, which is dammed shortly thereafter where the river intersects Route 198. The Little Patuxent is a tributary of the Patuxent River. The Patuxent enters the Chesapeake Bay approximately 100 km southeast of the Installation.

Fort Meade voluntarily maintains five Habitat Protection Areas (HPAs) on the Installation. HPAs are state-designated areas where state-threatened or -endangered species are located. In some cases, they are inherently unique (i.e. bogs) and do not contain species of concern. HPAs are included in Fort Meade's Natural Resource Management Plan and are protected as a BMP (best management practice). One HPA surrounding the Little Patuxent River is in close proximity to the Fort Meade WWTP (FMGIS, 2006). Its significance to the proposed action will be determined upon the outcome of pending Endangered Species Act consultation with Maryland's Department of Natural Resources (Marquardt, 2006).

To the south of Fort Meade and to the east of the Baltimore-Washington Parkway is the Patuxent Research Refuge, one of over 500 refuges in the National Wildlife Refuge (NWR) System managed by the U.S. Fish and Wildlife Service. It is currently the only NWR unit established to support wildlife research.

3.4.1 Vegetation

Development throughout Fort Meade has been extensive and few areas currently retain their native vegetation. The site of the Proposed Action is a previously disturbed grassy field mixed with patches of small trees. Most of the developed portions have been landscaped using a combination of turf grasses interspersed with native and exotic trees and shrubs including elm, maple, flowering cherry, black willow,

Figure 3.4 Proposed Project Area

flowering dogwood, and an assortment of holly cultivars**.**

Nearly 29 percent, or approximately 1,594 acres, of Fort Meade is woodlands. Natural tree cover consists of a mixture of softwood loblolly pine, pitch pine and Virginia pine and hardwoods consisting of sycamore, willow, sweetgum, birch, maple, and walnut. Smaller wooded areas are scattered throughout upland and wetland areas. They are dominated by white, red, and chestnut oak; mockernut and pignut hickory; flowering dogwood; blueberry; greenbrier; loblolly and pitch pine; and poison ivy (Versar, 2005).

Exotic species throughout the Installation include Japanese stilt grass, English ivy, garlic mustard, tree of heaven, multiflora rose, crown vetch, Japanese honeysuckle, common privet, Phragmites, and Asiatic tearthumb (MNPS, 2006).

Agriculture varies widely throughout the Bay states (Maryland, Virginia, Pennsylvania), where sludge from Fort Meade is applied. The western part of the region is dominated by dairy and grass-based beef operations. Crop production in the western part is largely pasture, hay, and other livestock feed to support the beef and dairy operations, with some corn, soybean, vegetable, and fruit production. The region is a major producer of poultry. Swine production occurs to a limited extent. The eastern part of the region is dominated by the production of corn, wheat, and soybeans. The nursery and greenhouse industries are rapidly expanding (CBF, 2005b).

3.4.2 Wildlife

Wildlife species found at Fort Meade are representative of those found in urban-suburban environments due to the heavily developed nature of the Installation. These species include white-tailed deer *(Odocoileus virginianus)*, gray squirrel *(Scioattolo Grigio)*, raccoon *(Procyon Lotor)*, opossum *(Didelphis virginiana)*, Eastern chipmunk *(Tamias striatus)*, field mouse *(Apodemus* sylvaticus), red fox *(vulpes vulpes)*, vole, and mole (Versar, 2005).

Bird species likely to inhabit or use the project site are limited to those that have adapted to an urban-suburban existence, such as American robin *(Zenaida macroura)*, catbird *(Dumetella carolinensis)*, mockingbird *(Mimus polyglottos)*, Carolina chickadee *(Poecile carolinensis)*, Carolina wren *(Thryothorus ludovicianus*, house wren *(Troglodytes aedon)*, downy woodpecker *(Picoides pubescens)*, common flicker *(Colaptes auratus)*, European starling *(Sturnus vulgaris L.)*, house sparrow *(Passer domesticus)*, rock dove *(Columba livia)*, mourning dove *(Zenaida macroura)*, and song sparrow *(Melospiza melodia)*. Warblers and raptors may be found during migrations and within the Patuxent Research Refuge, however, due to limited habitat, they are most likely not breeding on the Installation (Versar, 2005).

The Little Patuxent River supports one of only two populations of the Glassy darter (*Etheostoma vitreum*) in Maryland. The Glassy darter is a member of the Perch family (Percidae) named for its translucent body. It is relatively common immediately below the

Fort Meade Dam at Route 198. Various species of herring and shad are also seen regularly in the Little Patuxent (Francis, 2006).

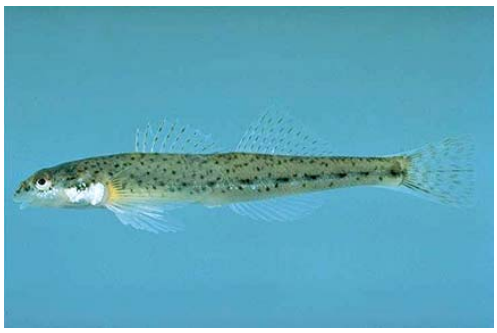

Figure 3.5 Glassy darter Photo courtesy of Virginia Tech College of Natural Resources (VT, 2006).

The Patuxent Research Refuge supports a wide diversity of wildlife in forest, meadow, and wetland habitats. The land is managed to maintain biological diversity for the protection and benefit of native and migratory species. During the fall and spring migrations, many waterfowl species stop to rest and feed. Over 200 species of birds occur on the refuge. A nesting pair of bald eagles has used the North Tract of the Refuge since 1989. Increasing forest fragmentation in the area due to urban development has damaged many populations of neotropical migratory birds. The refuge is one of the largest forested areas in the mid-Atlantic region and provides critical breeding habitat and an important nesting area for these species (USFWS, 2004).

Wildlife on agricultural lands throughout the Bay States is limited. There are incentives, such as conservation programs within the 2002 Farm Bill, designed to encourage farmers to adopt farming practices that protect threatened and endangered species and their habitats on private lands rather than harm them (NWF, date unknown).

3.4.3 Threatened and Endangered Species

Except for occasional transient individuals, no federally listed or proposed endangered or threatened species are known to occur on Fort Meade (Versar, 2005). There is one state-endangered species of concern, the Glassy darter *(Etheostoma vitreum)*, within the Little Patuxent River. State-listed species are not protected under the Endangered Species Act; however, whenever feasible, the Installation cooperates with state authorities in an effort to identify and conserve state-listed species (AAFES, 2006).

3.5 Cultural and Historic Resources

Cultural and historic resources are protected by a variety of laws and regulations, including the National Historic Preservation Act, as amended, and the Archaeological Resources Protection Act. Section 106 of the National Historic Preservation Act and implementing regulations (36 CFR 800) outline the procedures to be followed in the documentation, evaluation, and mitigation of impacts cultural resources. The Section 106 process applies to any federal undertaking that has the potential to affect cultural resources. Consultation regarding this project and its potential to impact historic resources will be made with the Maryland State Historic Preservation Office of the Maryland Historical Trust (MHT).

Although Fort Meade has numerous historic resources from its various past uses as a military camp and training cantonment, including a historic structure area in the south central part of the Installation, there are no identified cultural or historic resources on the immediate project site. The nearest cultural or historic resource to the project area is an archaeological site, site 18AN932, that is located 800 feet northwest of the proposed project site. Site 18AN932 appears to be the remains of the mid-nineteenth century Patuxent Forge Post Office and General Store (URS, 2004). In a letter dated June 22, 2004, the MHT Preservation Officer stated that site 18AN932 does "not meet the criteria for eligibility in the National Register of Historic Places given its loss of integrity and inability to yield important information" (MHT, 2004).

3.6 NOISE

Noise can be annoying or disruptive to normal activities for both people and wildlife. In extreme cases, it can have adverse health effects, such as hearing loss. Recognizing that its activities and equipment can generate potentially annoying noise levels, the U.S. Army has an Army-wide noise impact management program. The purpose of this program is to minimize the potential for annoying the Army's neighbors.

The loudness of activities at an Army Installation is measured in units called decibels (dB). The loudness of sound as heard by the human ear is measured on the A-weighted decibel (dBA) scale. Because most noise is generated in patterns (location, duration, timing and frequency) or is intermittent, the calculations of noise levels are typically averaged over a 24-hour period. Numerous "sound exposure events," the total sound exposure for single events expressed in one second of time, are totaled and averaged. This averaging of sound exposure events results in the Day-Night Level (DNL) noise average.

DNLs are weighted more heavily toward nighttime noise compared to daytime noise, because noise at night is more annoying. When DNLs are calculated for a location, the resulting product is a noise contour map. Just as a topographic map shows land elevations, a noise contour map shows zones of elevated noise levels. The higher the noise level, the more likely citizens exposed to that level would be annoyed.

Army noise zones and the associated annoyance level are shown in Table 3.2:

Table 3-2. Department of Army Noise Zones

Noise Zone	Percentage of Population Likely to be Annoyed	Average Day-Night Level from Transportation Sources	Acceptability*
I	<15%	<65 dBA	Acceptable
II	15-39%	65-75 dBA	Normally
III	>39%	>75 dBA	Unacceptable

Source: DOA, 1997

Noise level attenuates with increased distance from its source. Reductions in noise level are measured for each doubling of distance between the source of noise and the receiver. Reductions vary based on wind, variations in terrain, foliage, or other factors. Without taking such factors into consideration, reductions in noise level are typically higher over soft ground than over hard ground. For example, since the site of the proposed action includes herbaceous vegetation and trees, noise level attenuation would increase further with distance than it would over hard ground.

Structural features, such as walls and windows, also affect sound propagation. Sound typically enters a building through its acoustically weakest points, including windows and doors. The materials of which these points are composed (glass, wood, metal, etc.) provide additional sound reduction. Depending on the types of materials and their thickness, additional sound reductions of between 2 dBA and 20+ dBA could be expected (USHUD, 2004b).

Although ambient noise levels have not been measured in the project area, the existing acoustic environment can be inferred based on noise levels typically associated with particular land uses in the nearby area.

The main source of noise in the area surrounding the existing WWTP is vehicular traffic on Maryland Route 32. The noise level of traffic approximately 30 meters from a busy highway such as Highway 32 is around 75 dB (USDOT, 2000), which is normally considered acceptable according to Table 3.2. The sound level of traffic is likely to be even more acceptable at the site of the proposed action due to distance and the presence of existing noise barriers (i.e. trees).

Tipton Airfield, a private airfield, is less than 1 mile from the site of the proposed action. While jet aircraft at 300 meters in altitude reach a noise level of approximately 90 dB (USDOT, 2000), the overall sound level from an airport is based on a range of factors such as the number of nighttime or daytime jet operations, the flight path of major runway(s), and expected changes in airport traffic in future years (USHUD, 2004c). Noise from Tipton Airfield is not an issue, despite an average of 50,000 flights per year (136.98 per day). Few, if any, nearby communities have expressed concern. There are currently no noise abatement procedures (Seltzer, 2006).

An additional noise source in the vicinity of the project area is the DOI-operated small arms range located southeast of Tipton Airfield and utilized by the NSA. Other sources of noise on the Installation include normal operation of the heating, ventilation, and air conditioning systems; lawn maintenance; snow removal; and general maintenance of the streets and sidewalks (Versar, 2005). Generally, the existing DNL in the vicinity of the proposed action is within an acceptable range for the people and activities that occur nearby.

3.7 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

Fort Meade's Environmental Division coordinates and inventories hazardous materials and the disposal of hazardous waste. Emergency response to spills of hazardous waste and materials is conducted through on-site coordinators, the Installation's fire department, and the Installation's hazardous materials team. Fort Meade operates under a Spill Prevention Control and Countermeasures Plan (SPCC Plan) for all facilities where hazardous materials are stored, such as the WWTP. The SPCC Plan delineates measures and practices that require implementation to prevent and/or minimize spill/release from storage and handling of hazardous materials to protect ground and water surfaces.

Fort Meade generates relatively small quantities of a variety of hazardous wastes, and is regulated as Hazardous Waste Generator ID No. MD 9210020567. Procedures for handling, storage, transportation, and disposal of hazardous materials and wastes are outlined in the *Installation Hazardous Waste Management Plan, Fort George G. Meade* (USACHPPM-North 2004). The plan also outlines command responsibilities, identification procedures, inspections, personnel training, and spill response and emergency procedures (Versar, 2005).

On July 28, 1998, Fort Meade was designated a site on the National Priority List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), based on the evaluation of four locations, the Defense Reutilization and Marketing Office, Active Sanitary Landfill, Clean Fill Dump, and Post Laundry Facility, that have been identified as past storage and disposal sites for hazardous materials and wastes that contained hazardous substances. Contaminated areas investigated under the CERCLA actions, including Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs), are generally located along the southern border of the Installation and all are undergoing investigative or remediation activities at this time (Versar, 2005). None of these areas are located in the immediate vicinity of the project area.

Sludge disposed of from the WWTP requires a Sewage Sludge Utilization Permit (SSUP) to be obtained from the MDE by the contractor handling the sludge. SSUPs are required for any person who collects, incinerates, stores, treats, applies to land, transports or disposes of sewage sludge or septage. The purpose of the permit is to maintain a degree of safety, since sludge contains pathogens that can be harmful to human health. The process to obtain a sewage sludge utilization permit typically lasts at least 10 months. It involves regular testing, monitoring and paperwork (Freij, 2006).

Non-hazardous solid waste generated on Fort Meade is transported off the Installation by a contractor and disposed of at state-permitted landfills, such as the Annapolis Junction Transfer Station and the Millersville Landfill in Anne Arundel County.

3.8 INFRASTRUCTURE & UTILITIES

Water Systems

Fort Meade receives most of its potable water from six groundwater wells that are located on the south side of the Installation. The source of the raw water is the Patuxent Aquifer. The Little Patuxent River is used as a secondary source by Fort Meade's water treatment plant, which is located in the southwestern corner of the Installation near the intersection of Maples Road and O'Brien Road. The water treatment plant was last upgraded in 1983. Although the plant has a design capacity rating of 8.2 million gallons per day, its historical peak production rates ranged from 5.0 to 6.2 million gallons per day. Current water production ranges from 2.4 to 3.6 million gallons per day, depending on the time of year with highest production during summer months. Average daily plant production is 3.0 million gallons per day. Some pretreatment of the water is required prior to use. Fort Meade also maintains approximately 3.5 million gallons of water for emergency use in eight storage tanks on the base (Versar, 2005). All wastewater generated at Fort Meade is processed at the WWTP adjacent to the project site.

Electricity

Baltimore Gas & Electric (BG&E) provides the majority of the electricity used at Fort Meade, while some additional electricity is provided by Constellation Energy. A 115-kilovolt (kV) transmission line brings electricity to government-owned master substations on the Installation. The existing primary source for approximately 79% of Fort Meade's power is a 110 kV feederline from the BG&E Waugh Chapel Power Station that is located along the southern and eastern sides of the Installation along MD Route 32 in the immediate vicinity of the project site.

Fort Meade is in the process of privatizing and upgrading all on-base electrical facilities. A new electrical substation will be constructed, and all above-ground distribution facilities will be relocated underground as part of the privatization upgrades. Recent studies indicate that the new transmission and distribution facilities will be able to handle the projected growth at Fort Meade without impacting power supply redundancy (Versar, 2005).

Natural Gas

Fort Meade is supplied with natural gas by BG&E via high pressure mains, which form a loop around the Installation. The natural gas distribution system at Fort Meade is extensive and runs throughout the Installation. New gas-fired boilers installed throughout the Installation have replaced old centralized oil-fired boilers. Fort Meade is in the process of privatizing and upgrading all on-base natural gas facilities. Work is scheduled to be completed in September 2008 (Versar, 2005).

Transportation Systems

The primary highway access to Fort Meade is via MD Route 175 to Reese Road on the western side of the Installation; this access handles all visitor traffic. Additional access points include MD Route 295, MD Route 175 at Rockenback Road, MD Route 32 at Pepper Road and Mapes Road, and from two locations near the NSA facility in the southwest corner of the Installation (AAFES, 2006).

Access to the WWTP and the project site is via a short tertiary road located off of MD Route 198 (Fort Meade Road). Route 198 exists directly off of MD Route 32. Wet sludge is currently hauled from this location to agricultural lands throughout the region.

Roughly 50,000 planes annually fly in and out of Tipton Airport, located less than a mile from the existing WWTP facility. Tipton Airport was placed on the USEPA's National Priorities List of most contaminated Superfund sites in 1998. The U.S. Army completed clean-up of the airfield in 1999, and the site was subsequently delisted from the National Priorities List on November 12, 1999, before the property was transferred to Anne Arundel County for commercial flights (CPEO, 1999). The airport remains privatized today.

3.9 SOCIOECONOMICS

The population of Fort Meade includes approximately 8,000 military personnel; 25,000 civilian employees; 5,700 family members of military personnel; and volunteers (USEPA, 2006c). Many people who work at Fort Meade reside in the surrounding communities and commute to the Installation each day. The total population, defined as the total number of persons who are on the Installation on a daily basis between Monday and Friday during normal working hours, is over 60,000 people per year (Ameresco, 2006). This number is projected to grow approximately 30% in the next 5 years and approximately 100% over the next 30 years with planned expansions due to BRAC (Base Realignment and Closure), EUL, NSA, and RCI (Residential Communities Initiative) activities.

The Fort Meade WWTP operates seven days a week and generates approximately 17,000 tons of wet sludge annually, comparable to amounts generated by other low- to medium-sized plants throughout the state such as the Mattawoman WWTP in Charles County and the Patuxent WWTP in Anne Arundel County. All WWTPs in Maryland collectively produce more than 700,000 wet tons of sewage sludge per year (Freij, 2006). WWTPs have struggled to find cost-effective sludge disposal methods ever since ocean dumping was banned in 1988. As the restoration of the Chesapeake Bay continues, and as fewer nutrients are permitted to be released to surface waters, sludge destined for land application will require increasing amounts of amendments which will increase the total amount of sludge material requiring disposal (MDE, 2006b). This increase would be in addition to any increases in sludge production due to population growth on the Installation.

Approximately 50% of the sewage sludge produced in Maryland is applied to agricultural land, 18% is composted or palletized and made into a commercial soil supplement, and 21% is used for land reclamation efforts such as restoration of surface mines. The remaining 11% is dried and disposed in landfills or incinerated (MDE, 2006b). All sludge from the Fort Meade facility is land applied, weather permitting, in Maryland and Virginia. In 2004, the sludge generated from the Fort Meade WWTP contributed approximately 7% of all the sludge land applied in Maryland (MDE, 2004).

Annual sludge removal costs at Fort Meade for FY05 are estimated at $1.2 million. The vast majority of this cost is spent on hauling the sludge offsite. Table 3-3 shows the annual increase in sludge removal costs in recent years:

Table 3-3: Annual Operation Costs of Sludge Removal

Year	Wet Tons	% Solids	Trips	Cost (per dry ton)	Cost/ton % Increase	Annual Costs
2003	17,168	6.56%	749	$827	---	$931,693
2004	16,668	6.81%	687	$987	19.4%	$1,120,823
2005	17,104	6.09%	661	$1,083	9.8%	$1,128,000

Source: Ameresco, 2006

Cost per ton increased by 19.4% in 2004 and by 9.8% in 2005, even though the difference in tonnage did not vary as dramatically from year to year. The increase is mainly due to an increase in diesel fuel costs.

The company currently contracted to collect, transport, and dispose of the sludge from the Fort Meade WWTP is a medium-sized SBA 8(a) firm (approximately 50 full-time employees). The company hauled an average of 1.8 truckloads of sludge per day away from the plant in 2005. At least one full-time employee is dedicated to the Fort Meade contract, while other employees contribute time. There are several companies that manage sludge disposal throughout the Baltimore-Washington metropolitan area.

In Maryland, Sewage Sludge Utilization Permits (SSUP), discussed in Section 3.7, allow for land application of sludge on agricultural lands by the hauler, and thus are site-specific. Application rates are based on numerous factors such as crop nutrient requirements, projected yields, soil conditions, cumulative heavy metal loadings for the particular soil, sludge quality and composition, and timing. A public hearing is held before a final permit is issued.

The Commonwealth of Virginia has a less stringent sludge disposal policy. In 1998, Virginia's Department of Environmental Quality (VDEQ) amended the Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation that incorporates the Federal technical standards for land application and surface disposal of sewage sludge. Any private contractor that accepts responsibility for land application is issued a

Virginia Department of Health permit in accordance with the Biosolids Use Regulations and must comply with the Federal requirements of 40 CFR Part 503 (VDEQ, 2005).

Sludge collected from the Fort Meade WWTP is primarily land applied in Virginia, followed by Maryland and then Pennsylvania. The following table demonstrates trends in total farmland and in percent of total land in agriculture in each Chesapeake Bay state:

Table 3-4: Total Agriculture Land in Chesapeake Bay Area

	1992		1997		2002	
STATE	Total Farmland (million acres)	Percent of total land area in agriculture	Total Farmland (million acres)	Percent of total land area in agriculture	Total Farmland (million acres)	Percent of total land area in agriculture
Maryland	2.22	35.8	2.19	35.3	2.08	33.0
Virginia	8.30	33.3	8.75	35.2	8.62	34.0
Pennsylvania	7.19	25.1	7.82	27.3	7.75	27.0

Source: (USDA-ERS, 2006)

A majority of farms in all three states are less than 499 acres in size. According to the Chesapeake Bay Foundation, "since 1950, total farmland acreage in the Bay states has declined by 45 percent, from 33.7 million in 1950 to 18.5 million in 2002. More than 90,000 acres, almost 150 square miles, are lost each year to growth and development." Farmers are increasingly challenged by rising costs of land, farm equipment, fertilizer, and fuel (CBF, 2005b). Declining farmland acreage increases the demand for available land on which to apply the sludge to.

The amount of wet tons of sludge able to be applied per acre of farmland is based on numerous site specific characterizations. The principal economic benefit from the use of sewage sludge lies in the reduction of fertilizer needs, resulting from savings in the cost of nitrogen which is added to the soil when sludge is applied. Typical savings by using sludge in lieu of fertilizer and lime can be as high as $200 per acre in the region (Vogel, 2006). Potential disadvantages in using sludge may occur when excess phosphorus from the sludge is released as runoff and compromises water quality, or when there is a permanent increase in heavy metal content of the soil due to repeated sludge use. Therefore, the short-term economic advantages sometimes may be offset by costs required to adjust the nutrient balances at a later time (MCE, 1990).

Sludge continues to be preferred by some farmers because it is free to those who will take it. However, farmers can be constrained when using sludge as fertilizer. For instance, those who use a significant amount of sludge are not eligible for cost-share assistance for nutrient management plans. Nutrient management plans, intended to protect waterways from excess crop fertilizers and animal wastes, are mandatory in Maryland (MDA, 2006a). Also, some food processors that purchase raw goods from farmers, such as the National Food Processors Association, may not accept products from farms that use sludge. This is despite a National Research Council report from 1996 that confirms that

risks to crops, consumers, and the environment are negligible when sludge is properly treated and managed (USEPA, 2006b).

Land application of sewage sludge can be considered a liability to counties when it is not managed property. For example, remnants of sludge that become attached to the tires of hauling trucks can be accidentally discarded on roadways. If a road is accessible to the public, laws that prevent public exposure to pathogens require that it be cleaned immediately. Sludge can also generate objectionable odors that can cause conflict with neighbors.

Other standard fertilizer options, aside from dramatic alteration of farm management, include commercial fertilizers and manure. There are advantages and disadvantages to each. Commercial fertilizers tend to be easier to use when managing soil nutrients, but they are more expensive. Manure, like sludge, is difficult to manage because exact nutrient content of the material is often not known. Although manure is inexpensive compared to fertilizer, the cost of transporting it can make manure more expensive than sludge.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences associated with the alternatives. NEPA requires consideration of context, intensity, and duration of impacts, direct or indirect impacts, cumulative impacts, and measures to mitigate for impacts. Potential impacts are described in terms of type (beneficial or adverse), context, duration, intensity, and impairment.

4.1 WATER RESOURCES

4.1.1 Proposed Action

Construction

The construction phase of the project will require coverage under USEPA's Mid-Atlantic Region (Region 3) National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharge from construction activities, and, under the Construction General Permit (CGP). MDE is authorized to issue NPDES permits in the State of Maryland. The chief requirements of the NPDES general permit for construction sites are a construction Notice of Intent (NOI) and the implementation of Best Management Practices (BMPs) as outlined in the General Permit. The construction contractor would be required to comply with the Maryland Erosion and Sediment Control Guidelines for State and Federal Projects (MDE, 1990) and the Stormwater Management Guidelines for State and Federal Projects (MDE, 2001) to avoid and minimize erosion at the construction site and sediment runoff to any non-tidal wetlands in the vicinity of the proposed construction site.

General construction impacts associated with the development of the proposed BCC site could affect water resources by increased stormwater runoff from the site carrying sediment and contamination loads into surface water during times of heavy rain, and, by contamination from construction activities infiltrating area soils and percolating down into the groundwater. Increased stormwater runoff from developed sites leads to increased erosion of exposed soils, which leads to increased siltation in surface waterbodies. The first flush of rains after a long dry period will carry pollutants deposited on pavement into soils and water bodies, posing a risk of contaminating water and harming aquatic life. The incorporation of the mitigation measures into the design phase of the project would reduce impacts to water resources below the level of significance.

Due to its location in Maryland's Coastal Zone, this project will need to be evaluated for Coastal Zone Consistency. This review will occur concurrently with MDE's review of the state NPDES permit applications for both construction of the BCC and stormwater discharge (MDNR, 2004a). In addition, permits may need to be obtained from Anne Arundel County for both stormwater discharge and construction activities (Anne Arundel County, 2003).

The proposed action will not occur within or close enough to the 100 year floodplains or wetlands that are adjacent to the Little Patuxent River to cause a discernable impact and therefore, no permitting related to either floodplains or wetlands will be required.
The addition of the BCC to the Fort Meade WWTP is not likely to have more than a minimal impact on water quality in the immediate project area. The limited amount of area that will be altered during construction, combined with the implementation of BMPs and adherence to all permit requirements, is expected to minimize any impacts to water quality, and subsequently to aquatic species, during construction activities. Overall impacts to water quality will be adverse, negligible to minimal, and temporary.

Operation

The Fort Meade WWTP currently processes and treats between 2 and 3 MGD of wastewater, and the majority of the plant's treated water is discharged into the Little Patuxent River. Under the proposed action, the sludge that is currently separated in the WWTP and prepared for land disposal would be diverted to two new sludge receiving tanks at the BCC and would subsequently undergo a centrifuge processing step. In the centrifuge, an average of 21,600 gallons per day of wastewater (and a maximum of approximately 38,000 gpd) would be separated from the remaining sludge and would be sent back to the WWTP for treatment through the existing sanitary sewer system. The increase of the wastewater stream that the Fort Meade WWTP by an average of 21,600 gpd would equate to approximately a 1% increase in wastewater entering the plant and, correspondingly, in treated water ultimately being discharged into the Little Patuxent River (Bulgarino, 2006a; CBF, 2003). The current system is able to handle up to 4.5 MGD. Therefore, it is not believed that the increase in flow from the addition of the BCC and its corresponding discharge will alter treatment methods at the existing plant or have any impact on its discharge.

Because the proposed project will not cause the discharge from the WWTP to exceed the effluent limitations set forth in the existing NPDES surface water discharge permit that the WWTP operates under, a re-issuance of the NPDES permit for the WWTP is not expected to be needed. However, written notice regarding the change in sludge handling and return of wastewater should be made to MDE, the agency responsible for issuing the NPDES permit, so that the existing NPDES permit can be modified accordingly (MDE, 2002).

Since the implementation of the BCC will result in the Fort Meade sludge no longer being available, farmers will have to find an alternative source of fertilizer for their crops. Their options include using sludge from another treatment plant, using manure, or using commercial fertilizers. Manures and sludge can be expected to have similar water quality impacts, and changing the source of these impacts is not expected to change the impact itself. Chemical fertilizers may have a different impact on water quality as they are considered to have more quantifiable and balanced nutrient levels. This leads farmers to have more control over the levels of both phosphorous and nitrogen that they are applying to crops, as opposed to when applying manures and sludge. Often, when using the later, farmers run the risk of over applying one nutrient when trying to match the need

for the other (Hutchinson, 2006). The use of alternative types of fertilizers may help farmers adhere to Maryland's recently updated phosphorous restrictions, and help decrease the over application of phosphorous (Steinhilber, 2006). Nutrients that plants cannot use have the potential to runoff into surface and groundwater and exacerbate Bay pollution. Though it is unlikely that a change in fertilizer source will have a noticeable impact on overall water quality, the switch to commercial fertilizers has the potential to incrementally decrease contaminated runoff in the Chesapeake Bay.

Mitigation

BMPs would be placed along portions of the site perimeter to control erosion during all construction activities, as discussed below under the soils section. Under all circumstances, sediment runoff from the site should be captured and prevented from entering area surface water bodies, especially the Little Patuxent River.

4.1.2 No Action

Under the No Action alternative, there would be no impacts to water resources in the project area, as there would be no construction and no new effluent discharges that could affect water quality. The sludge generated at the Fort Meade WWTP would continue to be hauled to farmers for land application.

Though over time there would be an increase in the amount of wastewater and sludge generated at Fort Meade due to the projected population increases, it is anticipated that there would be sufficient agricultural lands available in which to continue to land apply all the WWTP sludges. If sufficient land is not available, the sludge would have to be hauled to a wastewater treatment center capable of processing the material. Chesapeake Bay water quality and aquatic habitat health will continue to be influenced by runoff of excessive nutrients from agricultural lands. Aquatic species can be expected to be impacted when water quality is impaired. With all else remaining constant, including adherence to local, state and federal regulations, the continuation of the land application of Fort Meade sludge is likely to contribute incrementally to water resource impairment in the Chesapeake Bay watershed. However, this contribution would not likely be measurable and the No Action alternative would result in only a negligible, adverse impact on water resources over the long-term.

4.2 SOILS AND LAND USE

4.2.1 Proposed Action

Soils

The construction of the BCC building and its associated facilities will include three process areas, including a sludge-holding tank area, the conversion center, and an ash collection area (See Figure 2-1). The BCC building itself will be just over 2,600 square

feet. In addition, the project will require the construction of an access road from the main entrance drive of the wastewater treatment plant up to the new building. The entire footprint of disturbance is expected to be 12,281 square feet. This area would likely be contoured to an even grade according to architectural and engineering design specifications. Any soil removed during construction activities would need to be stabilized according to Maryland state policies to prevent erosion.

Construction equipment to be used during the various facets of site development would include bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, and compactors. As with almost any construction project involving the use of heavy equipment, there is some risk of an accidental fuel or chemical spill, and the potential contamination of soils. Fuel products (petroleum, oils, lubricant) would be needed to operate and fuel excavation equipment. To reduce the potential for soil contamination, fuels would be stored and maintained in a designated equipment staging area. A person(s) designated as being responsible for equipment fueling would closely monitor the fueling operation, and an emergency spill kit containing absorption pads, absorbent material, a shovel or rake, and other cleanup items, would readily be available on site in the event of an accidental spill. Following these precautions, the potential for an accidental chemical or fuel spill to occur and result in adverse impacts on soils would be negligible.

Soil disturbance is defined as anything that causes the impairment of physical, chemical and biological properties and processes, such as erosion, compaction, displacement, rutting, burning, loss of organic matter and mass movement of soil (Deluca, 2001; USDA-ARS, 2005). Construction equipment also has the potential to compact soil, reducing the porosity and conductivity of the soil. Such compaction is likely to slightly increase the amount of surface runoff in the immediate area. Stabilization of the soils will be required to prevent sediment runoff impacts to water sources, possibly degrading water quality.

The National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act prohibits the discharge of any pollutant, including sediments, to waters of the United States. The discharge of stormwater runoff from construction sites is regulated under the NPDES program. Typically, sediment erosion rates from construction sites are 10 to 20 times greater than those from agricultural lands, and 1,000 to 2,000 times greater than those of forest lands. A Storm Water Pollution Prevention Plan (SWPPP) will be developed for the site, as per the requirements of the NPDES permit. SWPPPs contain measures to reduce soil erosion and prevent pollution from petroleum, oil, and lubricants (POLs) and other chemicals or hazardous/toxic materials at construction sites. Specifically, SWPPP plans assess the characteristics of the site such as nearby surface waters, topography, and storm water runoff patterns; identify potential sources of pollutants such as sediment from disturbed areas, and stored wastes or fuels; and identify BMPs which will be used to minimize or eliminate the potential for these pollutants to reach surface waters through storm water runoff.

Standard construction BMPs, such as installing perimeter silt fences, spreading straw and mulch to protect exposed ground, covering stockpiles of earth or soils, and so forth, will minimize runoff, erosion and impacts to on-site and off-site soils during construction activities. Once operational, stormwater from the BCC area would continue to be regulated, and the impacts to soils would be expected to be minimal. Overall impacts to soils at the proposed project site from both construction and operation activities are expected to be adverse but minimal due to the relatively small footprint of the BCC, the small associated soil disturbance area, and the minimal grade and erosion potential of the soils on site.

Land Use

While the construction of the BCC will limit future uses of the plot of land, the area is small and bordered by the existing WWTP, roads and power lines. There would be no zoning or development conflicts associated with the proposed project. Therefore, the proposed action will have a negligible impact on land use at the project site.

With the subtraction of Fort Meade sludge from the potential fertilizer sources that are used by area farmers, new fertilizer sources will need to be found. As long as the replacement fertilizers are used without being in conflict with local land use and planned future use of the area, no impact from this change in fertilizer source to land use can be expected.

Mitigation

BMPs should be vigorously incorporated and maintained into all project plans. BMPs at construction activity sites typically consist of various erosion and sediment control measures. At the proposed site, silt fences, straw bales, and other temporary measures would be placed in ditches and along portions of the site perimeter to control erosion during construction activities. These temporary erosion prevention measurements should be maintained in place until the site vegetation is firmly established and soil has stabilized. Regular inspections of the erosion and sediment control measures would be performed after any storm event by qualified personnel, and as required in the NPDES General Permit.

All disturbed areas would be stabilized and revegetated with native plant vegetation following commencement of construction activities. Proper seed selection will result in native plants with deep root systems, which will increase local times of concentration and reduce site outflows. Loss of pervious soils may result in increased surface runoff, perhaps contributing incrementally to impairment of local water bodies.

4.2.2 No Action

Soils

Under the No Action alternative, no grading or construction activities would occur at the project site and there would be no direct impacts to soils and land use on the site of the proposed action. Conditions would continue as they presently are.

The No Action alternative would result in the continued land application of Fort Meade sludge. Impacts to soils, such as a change in texture or productivity, from continued use of sludge can result from mismanagement of the land application (USEPA, 2000a). This essentially means applying sludge at a rate where it will not be efficiently utilized by the crops needing fertilization, which can be difficult to determine (Steinhilber, 2006). Soil texture is a dominant factor in determining how much applied sludge will mix in with soil and have nutrients taken up by plants, and how much will runoff or leach into groundwater (CSWRCB, 1999). Agricultural practices in the Chesapeake Bay watershed have resulted in excess nutrient runoff due to poorly managed fertilizer application. Though this issue will continue to exist in this region, soil productivity, texture or physical properties are not expected to change based on the continued use of sludge from Fort Meade as fertilizer, as it only accounts for a very small percentage of total sludge applied.

Land Use

The proposed site for the BCC is already devoted to WWTP development, is small and grassy with soil stockpiles on it. Not constructing the BCC will not have an impact on land use on the Fort Meade WWTP site or in Maryland and Virginia counties, where the sludge is currently being land applied. Area farmers will continue to receive sludge from Fort Meade to use as fertilizer.

4.3 AIR QUALITY

4.3.1 Proposed Action

Impacts on air quality resulting from the proposed action alternative can be divided into two main categories: 1) temporary effects associated with emissions from construction equipment and fugitive dust on-site, and 2) operational impacts resulting from emissions from the BCC.

Construction

A construction permit would be required through MDE's Office of Air Management for emissions for equipment that will be used during the construction process. Heavy equipment needed to build the BCC would likely include graders, bulldozers, backhoes, dump trucks, cement trucks, cranes and other diesel and gasoline-fueled equipment.

Intermittently, this equipment would emit quantities of five criteria air pollutants: carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), particulate matter (PM_{10}), and volatile organic compounds (VOCs). In addition to tailpipe emissions from heavy equipment, the temporary disturbance of just over 12,000 square feet of ground surface during excavation and grading activities to prepare the site for construction of BCC could potentially generate fugitive dust.

Fugitive dust, such as dirt stirred up from construction sites, can affect public health. The type and severity of the effects depend in large part on the size and nature of the dust particles. The types of effects that can occur include inhalation of fine particle that can then accumulate in the respiratory system causing various respiratory problems including persistent coughs, wheezing, eye irritations, and physical discomfort.

Construction personnel would be expected to implement reasonable measures, such as applying water to exposed surfaces or stockpiles of dirt, when windy and/or dry conditions promote problematic fugitive dust emissions. Adhering to these would minimize any fugitive dust emissions. Use of mitigation measures, in addition to the fact that there are few nearby residents, would reduce the possibility of adverse impacts from fugitive dust emissions. Overall, impacts from fugitive dust emissions would be temporary in duration and of minor intensity.

Exhaust emissions from equipment used in construction, coupled with likely fugitive dust emissions, could cause minor to moderate, short-term degradation of local air quality, but would not be high enough to result in significant deterioration.

Operation

The MDE Office of Air Management will require a minor source operational permit for the project, in order to regulate emissions from the proposed BCC. During the initial 20-year operation term, the contractor will hold all operational permits for the BCC. Subsequent to the initial 20-year term, the Army may choose to assume control for all operations and would then become the permit holder. The following tables (4-1 and 4-2) contain the anticipated air pollutants emitted from operation of the proposed BCC. These calculations are conservatively derived, as they are based on operating the BCC facility at maximum capacity 24-hrs per day, 7-days per week. Actual operation of the BCC would be at a lower capacity for 5 days per week. Although sludge input to the BCC facility and associated combustion process operations would increase in response to increased wastewater generated from growth of the Installation, operation of the BCC would not at any time exceed the calculated emissions quantities.

Table 4-1: BCC Criteria Pollutant Emissions

USEPA Criteria Pollutant	Tons/yr (before abatement)	Tons/yr (after abatement)	As compared with NAAQS	As compared with MD standards
Filterable Particulates (PM)	132.2	1.32	In compliance	In compliance
Sulfur Dioxide (SO_2)	37	1.1	No data available	No data available
Nitrogen Oxides (NO_x)	6.6	6.6	In compliance	In compliance
Carbon Monoxide (CO)	41	4.1	No data available	No data available
Lead (Pb)	1.3	0.46	In compliance	In compliance
Total Non-methane Organics	2.2	0.7	No data available	No data available

Source: Trinity, 2006; Ameresco, 2006

For the purposes of these analyses, filterable particulates are analogous to total particulate matter, and VOCs have been divided into total non-methane organics and methane. The tons per year emissions prior to pollution abatement are estimates based on the raw quantities of emissions generated during the combustion process; the tons per year emissions after pollution abatement are emission estimates based on the pollution reduction technologies that would be implemented at the proposed BCC.

Table 4-2: BCC Additional Substance Emissions

Other Substances	Tons/yr (before abatement)	Tons/yr (after abatement)	As compared with Federal Standards
Mercury (Hg)	0.006	0.00021	In compliance
Methane (CH_4)	1.0	n/a	n/a
Sulfur (S)	9.5	0.3	n/a
Iron (Fe)	1.5	0.1	n/a

Source: Trinity, 2006

The Fort Meade BCC will include several advanced pollution abatement technologies in order to minimize emissions from the combustor unit. These technologies include an afterburner, a cyclone, a wet electrostatic precipitator (WESP), a wet scrubber and an impingement control device (See Table 4-3). Afterburners are devices that remove organic gases (such as carbon monoxide and non-methane VOCs) via incineration (BAAQMD, date unknown). Cyclones remove particulate matter from an air stream via centrifugal force, and WESPs remove particulate matter via electrostatic charge. Venturi wet scrubbers remove particles as the exhaust comes into contact with a scrubbing

solution (often water) in a narrow, cone-shaped tube that increases pressure and velocity of the fluid substance. Impingement control devices reduce acid gases by contact.

Table 4-3: BCC Pollution Abatement Equipment

Control Device	Pollutant	Description
Afterburner	Organics	Burns off remaining organics
Cyclone	Particulates	Removes particles from exhaust through mechanical inertia
Venturi	Particulates	A Rod Deck Scrubber is actually a "multi-venturi" scrubber (rods).
Impingement	Acid Gases	A Rod Deck Scrubber utilizes impingement, as the exhaust gases pass through the trays (decks).
WESP	Particulates	Coronas electrically charge and collect particulates

Source: Trinity, 2006

Downstream of the combustion heat exchanger, the exhaust gas will first go through a cyclone and then through the scrubber and WESP devices. These three units will provide a combined reduction of 99% of particulate matter emissions. The WESP would be directly connected to an air stack and would be the only air emission source to the outside environment. The scrubber/WESP pollution abatement system is the recommended and accepted arrangement by the USEPA for the removal of particulate matter and hazardous air pollutants emitted during sludge combustion (Ameresco, 2006).

After combustion and pollution treatment, the remaining emissions can be expected to have only trace amounts of contaminants in them. These include particulate matter, SO_2, NO_x, CO, S, Fe, and non-methane organics. All of these contaminants are at levels that are in compliance with Federal regulations, both NAAQS and HAPs. More analysis needs to be done in order to determine potential impacts from SO_2, CO, and non-methane organics (Trinity, 2006).

The minor source air emissions permit that is needed for the operation of the BCC will likely require monitoring of opacity, CO_2, and oxygen (Bulgarino, 2006). As 99% of the particulate matter generated by the BCC is expected to be removed via the proposed pollution abatement technologies, and the remaining net emissions levels are of a minor scale, BCC emission levels are expected to be in compliance with Maryland emission thresholds even though there exists cumulative impact of particulates in this area. As noted in Chapter 3 (Section 3.3), particulate matter has the potential to impair both human and environmental health. In Anne Arundel County specifically, any additional emission of particulate matter will add incrementally to the levels that are already considered to be in non-attainment, according to USEPA's NAAQS levels.

The emissions of NO_x, lead, and mercury will likely be in compliance with emission thresholds in and around the proposed project site. Lead and mercury emissions are expected to be negligible, and NO_x are expected to be in compliance with both federal

and state emission thresholds. NO_x emissions can result in air quality degradation in a region as the NO_x compounds react with sunlight to form ozone (USEPA, 2006g). Anne Arundel County is currently considered a non-attainment area for both 1- and 8-hour ozone, and so any additional ozone can be a cause for concern.

In addition to the stationary emissions from the BCC, the proposed action will require hauling of 1 truck load per week of ash to a local landfill or contractor for reuse. Table 4-4 summarizes data calculated for the pollutants emitted from the truck traffic associated with the disposal of ash from the BCC. This data was based on a commercial truck with a 500 horsepower engine traveling at 55 miles per hour for 10 miles roundtrip, 52 trips per year. This data equates to 9 hours per year of hauling truck operations that would be attributable to the proposed ash disposal methods. Table 4-4 also combines the calculated emissions from BCC operation to the projected truck emissions for in order to generate the total emissions anticipated from the proposed project.

Table 4-4: Total Criteria Pollutant Emissions from Proposed Action

USEPA Criteria Pollutant	Truck Emission Factor* (g/hp-hr)	Tank Truck Emissions (lbs/yr)	BCC Emissions (lbs/yr)	Total Proposed Project Emissions (lbs/yr)
Filterable Particulates (PM)	0.1	1	2,800	2,801
Nitrogen Oxides (NO_x)	4	42	13,200	13,242
Carbon Monoxide (CO)	15.5	162	8,200	8,362
Total Volatile Organics	1.3	14	1,400	1,414

Based on Emission Standards Reference Guide for Heavy-Duty and Nonroad Engines, (USEPA, 1997)

The construction and subsequent operation of the Fort Meade BCC will not significantly affect regional air quality in and around Anne Arundel County, Maryland, due to the relatively minor amount of emissions generated. As stated in Section 3.3, Anne Arundel County is ranked as the top geographical emitter of PM 2.5, sulfur dioxide, and nitrogen oxides in the State of Maryland (Scorecard, 2005). Numerous industrial plants as well as activities associated with the large urban corridors of Washington DC and Baltimore, MD contribute to the degraded air quality in this region. Overall, the emissions released from the proposed action will be an incremental addition to a larger air quality problem, but will not in of themselves constitute a significant impact to air quality.

4.3.2 No Action

Under the No Action, the BCC would not be constructed and sludge generated at the Fort Meade WWTP would continue to hauled offsite for land application. Although a stationary emission source from the combustion of sludge would not be operated under the No Action alternative, mobile emissions from hauling practices would continue and

possibly increase in response to Installation growth. Table 4-5 summarizes data calculated for the pollutants emitted from the trucks used in hauling the sludge offsite from the WWTP. This data was based on a commercial truck with a 500 horsepower engine traveling at 55 miles per hour for 216 miles roundtrip, 718 trips per year. This data equates to 2,820 hours per year of hauling truck operations that are directly attributable to current sludge disposal methods.

Table 4-5: Criteria Pollutant Emissions from No Action

USEPA Criteria Pollutant	Emission Factor* (g/hp-hr)	Tank Truck Emissions (lbs/yr)	*Proposed Action Alternative Emissions (lbs/yr)*
Filterable Particulates (PM)	0.1	311	*2,801*
Nitrogen Oxides (NO_x)	4	12,433	*13,242*
Carbon Monoxide (CO)	15.5	48,178	*8,362*
Total Volatile Organics	1.3	4,041	*1,414*

Source: Bulgarino, 2006
**Based on Emission Standards Reference Guide for Heavy-Duty and Nonroad Engines, (USEPA, 1997)*

The emissions from the No Action alternative are compared to the emissions from the Proposed Action alternative in Table 4-5, and show that emissions from the Proposed Action will exceed those of the No Action for PM, but will emit similar amounts of NO_x and considerably less CO and VOCs.

Overall, the impacts from the No Action alternative on air quality would be similar to those of the Action alternative. Continued hauling practices will not have a significant impact on air quality in the project vicinity, but the emissions from these practices will contribute incrementally to a larger air quality problem in the greater Baltimore-Washington corridor.

4.4 BIOLOGICAL RESOURCES

4.4.1 Proposed Action

Vegetation

Construction at the site of the Preferred Alternative may require the removal of trees and shrubs. The threshold level of significance for vegetation is removal in amounts that would alter the habitat in a manner detrimental to the species living there. During design and construction, efforts would be made to minimize the impacts to vegetation by retaining a portion of vegetation on the site. The project proponents/contractors would be required to preserve 20% of the project area as forest, or, if space is not available within

the project area or the location is otherwise deemed unsuitable, then the proponent would be required to plant or interplant at a designated forest conservation area within Ft. Meade. Construction of the proposed project would not contribute to the fragmentation of the existing forest habitat because the proposed action site is located within an area that is already significantly disturbed due to proximity to a major highway and existing WWTP facilities.

There would be no land application of sludge from Fort Meade onto farms in the Bay states. Crops would not receive the benefits of sludge as a fertilizer, nor would they begin or continue to accumulate associated heavy metals that may harm vegetation in the long-run.

Wildlife

Under the Preferred Alternative, there would be a permanent loss of over 2,600 square feet of habitat for construction of the BCC building. An additional strip of habitat would be lost for construction of an access road from the main entrance drive of the WWTP to the new building, a distance of roughly 200 feet. The total footprint of disturbance is expected to be 12,281 square feet. The threshold level of significance for wildlife is the disruption of normal behavior patterns or disturbance to habitat at a level that would substantially impact the Installation's ability to either avoid jeopardy or conserve and recover the species.

The majority of the species that currently use the area have adapted to living in urban areas and co-existing with human activity. Many of these same species are also mobile generalist species that use a variety of interspersed and fragmented habitats, range over wide areas for food and cover, or are migratory and would use the site seasonally. Therefore, it is anticipated that most wildlife species would be able to avoid the disturbance by relocating to adjacent minimally disturbed areas. Clearing of vegetation and earth-moving activities may result in some unavoidable mortality to burrowing and less mobile fauna. This loss of habitat would result in a negligible adverse effect given the limited amount of space required by the proposed BCC.

Numerous studies have been conducted attempting to document the effects of noise on wildlife. Wildlife responses to noise vary considerably and are a function of many other variables aside from noise, including the characteristics of the noise and its duration, life history characteristics of the species, habitat type, seasonal and current activity of the animal, sex, age, previous noise exposure, as well as other physical stressors such as drought. General wildlife responses to human-made noise are attraction, tolerance and aversion, which are summarized in the following list of potential responses:

- Most animals habituate to sounds (e.g., truck and equipment noise) disassociated with other threatening stimuli.
- Animals (e.g., ungulates) that habituate to traffic noise are vulnerable to oncoming vehicles.
- Steady sounds are less prone to startle animals than sudden onset noise.

- Human-made noise can mask meaningful noise (e.g., mating and other communication).
- Motivation to find food can make animals tolerant of noise.
- Different species have different levels of noise tolerance and habituation.
- Most effects of noisy disturbances are mild enough that they may never be detectable as changes in population size or population growth.
- Animal aversion is measured in avoidance responses and can be lessened if animals can predict exposure (e.g., warning signal before conveyor startup).

Construction noise impacts would likely only impact small game animals that are typically found in the affected landscape, such as mice or rabbits. Since the construction is proposed to occur roughly 100 meters (328 feet) from the highway, wildlife species that are sensitive to noise may already be displaced due to highway noises. In effect, once construction has subsided, the eventual BCC may act as a barrier to highway noises for those species (CST, 1996).

There would be no land application of sludge from Fort Meade onto farms in the Bay states. Wildlife would not be affected by pathogens found in the sludge after land application of sludge, nor by excess nutrients that may be released into nearby waterways.

Threatened and Endangered Species

Since there is no evidence that any federally endangered or threatened wildlife species occur at the site of the proposed action, no threatened or endangered species or critical habitat would be adversely affected by the proposed action. Although the majority of treated water from the WWTP is discharged into the Little Patuxent River, these discharge activities require the adherence to water permits that address state- and federally-listed species. Impacts to the Glassy darter as a result of any increase in the amount of discharge to the river as a result of the operation of the BCC are expected to be negligible. No impacts to other state-threatened or endangered species areas are anticipated.

Mitigation

Native vegetation will be planted around the new building once construction is complete. Landscaping activities will be coordinated with Natural Resource personnel in the Fort Meade Environmental Division. All construction equipment should be treated according to BMPs in a manner that minimizes the spread of any invasive species either onto or from the project site.

4.4.2 No Action

No construction activities would occur under the No-Action Alternative and no change to existing conditions at Fort Meade would occur. Land application of sludge would

continue on farms throughout the Bay states. Vegetation on farms would continue to receive the benefits of sludge as fertilizer.

The use of wet sludge is not permitted on agricultural lands where threatened and endangered species may be found. Although some wildlife activity on farms may be interrupted by sludge use, applicable laws should in all cases be followed and mandatory permits obtained. Runoff from agricultural lands should be monitored to avoid changes to water and air quality, which could indirectly affect the health of plants and animals in the Bay. No significant changes to biological resources are anticipated from the No Action alternative.

4.5 CULTURAL AND HISTORIC RESOURCES

4.5.1 Proposed Action

The construction and operation of the BCC will not affect any known cultural resources or historic properties, due to the distance of these resources from the proposed project site. Therefore, negligible impacts to archaeological resources are anticipated under the Proposed Action alternative. If culturally or historically significant materials or human remains are unearthed during construction, operations would halt immediately and the Maryland State Historic Trust would be consulted immediately in accordance with 36 CFR 800.13.

4.5.2 No Action

Under the No Action alternative, the BCC would not be constructed and no ground disturbance activities would occur in the project vicinity. There would be no potential to damage or degrade cultural or historic resources from the presence or operation of the combustion facility at the proposed site.

4.6 NOISE

Certain facilities, communities, and land uses are more sensitive to a given level of sound than others. Such “sensitive receptors” include schools, churches, hospitals, retirement homes, campgrounds, wilderness areas, hiking trails, and certain species of threatened or endangered wildlife. Impacts from noise production are generally assessed with respect to changes in noise levels experienced at sensitive receptors.

4.6.1 Proposed Action

Construction

Under the Preferred Alternative, construction and land-disturbing activities would result in temporary, intermittent increases in noise levels. Noise generators during construction

include vehicles and equipment involved in site clearing and grading, construction, landscaping, and finishing work. Noise produced by diesel-powered construction equipment is typically 85 dBA at a distance of 50 feet from the equipment (FTA, 1995). The noise of individual pieces of construction equipment can vary considerably depending on age, condition, manufacturer, use, and a changing distance from the equipment to a receptor location. Operation of the equipment also varies considerably throughout the construction phase and day to day.

Federal workplace standards for protection from hearing loss require that constant noise exposure must not exceed 90 dBA over 8 hours. The highest allowable sound level to which workers can be constantly exposed is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment which will reduce sound levels to acceptable limits (NCSE, 2000).

Although construction noise may be audible at a sensitive receptor located within several miles, the proposed construction is nearly 1,000 feet from the closest structures in the community aside from the existing WWTP. The closest structures already experience background noise due to vehicular traffic on State Highways 32 and 198, and air traffic associated with the Tipton Airfield and other area airports. Distance from the proposed site and the presence of natural noise barriers would allow for significant attenuation. Construction would not significantly contribute to ambient noise levels. Minor, localized, short-term noise impacts would continue for approximately nine to twelve months from the commencement of site work to the end of construction activities.

Operation

The BCC is composed of the following 11 main components:

- (2) progressive cavity transfer pumps
- (2) Sludge Receiving Tanks (10,000 gallons each)
- (1) Filtrate Tank (5000 gallons)
- Decanter Centrifuge
- Tray Dryer
- Challenger Combustion System™
- De-ashing system
- Biosolids heat recovery air dryer
- Scrubber and WESP

A metal building will be constructed to house the centrifuge, dryer, combustion system and pollution control equipment. The noise level of the loudest piece of equipment, the decanter centrifuge with motor, does not typically exceed 85 dB.

According to HUD Noise Assessment Guidelines, DNL contributions from each source of noise, the combined DNL, is the value used to determine the acceptability of a noise environment. Sound levels in decibels are not combined by simple addition. Rather, the numerical difference in sound level between two levels is given a value. This value is then added to the sound level of the louder noise source. Values are presented in Table 4.6:

Table 4-6: Combining dB Values

Difference in Sound Level	Add to Larger Level
0	3.0
1	2.5
2	2.1
3	1.8
4	1.5
5	1.2
6	1.0
7	0.8

Source: (USHUD, 2004c)

In a worst-case scenario, if every piece of equipment was as loud as the centrifuge at 85 decibels, there would be no (0) difference in sound level amongst various pieces of equipment. A value of "3.0" would be added to a level of "85 dB" per piece of equipment. If ten pieces of equipment in addition to the centrifuge were to have a maximum sound level of 85 dB, the combined DNL for the BCC would be no more than 115 dB.

Since equipment would be enclosed in a metal building, noise levels from the BCC would be reduced significantly. Depending on the type and thickness of metal used to enclose the equipment, if the surface weight density is greater than 4lb/ft2 and there are no significant openings through the barrier, transmitted sound will likely be negligible (USHUD, 2004b).

If the metal building were to result in a smaller reduction in noise from the BCC than proposed in the sample calculation, the noise level would likely be further attenuated with distance from existing sensitive receptors. Sensitive receptors located in the vicinity of the proposed project site are listed below in Table 4.7, along with their approximate distance from the nearest portion of the project site:

Table 4.7: Sensitive Receptors Near the Project Site

Sensitive Receptor	Approx. Distance from Site (meters)	(feet)
Maple Glen School	1400	4592
Welch's Trailer Park	1400	4592
DC Children's Center	1900	6232
Zigler School	2000	6560

Since the nearest sensitive receptors are over 4,500 feet from the site, it is reasonable to conclude that sound from operation of the BCC will attenuate significantly by the time it reaches them.

Combined DNLs from the BCC plus the existing WWTP, State Highway 32, and Tipton Airfield, are expected to be low by the time the combined noise reaches the sensitive receptors. Therefore, sensitive receptors will not be significantly affected by noise impacts during operation of the proposed BCC.

Potential noise impacts on wildlife are discussed in Section 4.4.

Long-term noise impacts from truck traffic due to sludge disposal would likely be reduced, since the new BCC would result in less sludge production.

Mitigation

Noise impacts during construction could be minimized by limiting construction activity to daylight hours and by using properly maintained and muffled equipment. Hearing protection equipment would be required for sound levels that exceed Federal workplace standards.

The metal building surrounding the equipment would mitigate noise impacts during operation. Resulting noise may make only a negligible to minor contribution to ambient noise levels from surrounding sources (mainly the existing WWTP, vehicular traffic along State Highway 32, and the Tipton Airfield).

4.6.2 No Action

Under the No Action alternative, the BCC would not be built, and there would be no associated noise from new construction or operation of a new facility.

Beneficial noise impacts due to the reduction in truck traffic related to sludge disposal would not be realized under this alternative.

4.7 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

4.7.1 Proposed Action

The construction of the BCC would generate construction debris waste, which would require proper disposal. Recycling and/or reuse of all discarded materials would be encouraged whenever possible. Construction is estimated to take approximately nine to 12 months, and would begin with site preparation, the establishment of a 2,600 square-foot foundation, and set-up of underground utilities. Design of the above-ground mechanical, piping, building, and electrical systems are being developed. Portable

restrooms for employee use during the construction period would be provided by a private contractor.

Any non-hazardous construction debris or other solid waste that cannot be reused or recycled will be disposed of at Millersville Landfill in Anne Arundel County or an analogous local landfill. The construction contractor would be responsible for ensuring that the waste material generated is properly disposed.

Dry ash will be generated during the sludge combustion process. Sludge from the Fort Meade WWTP has been sampled on two occasions to determine the constituents of both the raw sludge, and, its ash following combustion (Penniman and Brown, 2005; Martel, 2003). The most recent results of the sludge sampling are displayed below in Table 4.8. Full laboratory data of the sampling analysis can be found in Appendix B of this document.

Table 4-8. Analysis of Sludge Sample

Element	Percent
Carbon	37.10%
Hydrogen	5.62%
Nitrogen	3.15%
Sulfur	0.68%
Chlorine	0.21%
Ash	33.46%
Oxygen	19.78%
Heat of Combustion	6850 Btu/lb

Source: Penniman and Brown, 2005

The laboratory analysis of the most recent sludge sample indicates that it contains relatively high levels of carbon and oxygen. Iron, calcium, and potassium are more prominent than other minerals that occur after drying. Following incineration of the sludge, further testing was done on the residue ash to determine the metal components and classification of the ash. Metals that have been found at detectable levels in the sludge include copper, nickel, mercury and zinc (Martel, 2003). However, the dry ash from the Fort Meade WWTP has been determined to be non-toxic and can be accepted at landfills for disposal.

Whenever possible, the dry ash will be recycled and/or reused. There are several possible reuse applications for municipal solid waste ash. These applications can be broadly grouped into four main categories: construction materials (cement, concrete, ceramics, glass and glass-ceramics); geotechnical applications (road pavement, embankments); "agriculture" (soil amendment); and, miscellaneous applications (sorbent, sludge conditioning) (Ferreira et al, 2003). Reusing/reclycling ash when possible will decrease the requirements for landfill space

Maryland's Department of the Environment's Solid Waste Division requires a Sewage Sludge Utilization Permit (SSUP) for any person who collects, incinerates, stores, treats, applies to land, transports or disposes of sewage sludge or septage in Maryland (MDE, 2005), including dry ash. A SSUP will be obtained in order to dispose of dry ash either via recycling or in a municipal landfill.

Fort Meade submitted a SSUP application for a "research project" permit in November of 2005. They received approval in May of 2006. Finalization of this permit will occur once an obligatory performance bond is obtained. Then, the facility will be issued a permit to operate for two years. Fort Meade has also submitted a SSUP application for a more permanent "burning" permit, which MDE will begin processing once the first permit is issued.

Potentially hazardous wastes generated from the routine maintenance of the BCC could include waste oils containing solvent residuals, solvents and degreasers. Hazardous wastes would be disposed of off site at a licensed facility. The proposed BCC would not store any hazardous materials beyond those routinely used for maintenance and office supplies. All handling, storage, transportation, and disposal of hazardous materials would be conducted in accordance with the *Fort Meade Management Plan for Hazardous Materials and Hazardous Waste* (U.S. Department of the Army 1993) and any other applicable federal, state, local, and Installation guidelines. Provided all personnel follow applicable guidelines, impacts from storage or handling of hazardous materials and other wastes would be localized and negligible.

Mitigation

During both the construction and operation phases of the BCC, as many materials as possible should be recycled and/or reused to minimize the amount of waste generated by the facility.

All hazardous materials stored and/or generated at the BCC should be properly and uniformly labeled and housed in appropriate storage facilities. Prior to commencement of facility operations, staff should provide the appropriate authorities with a walkthrough of the facility to familiarize them with the nature and location of all hazardous materials kept on the premises, in order to facilitate appropriate responses in the event of facility emergencies.

4.7.2 No Action

Under the no action alternative, there would be no impacts on hazardous materials or waste management, as there would be no new demand on the current supplies or facilities.

4.8 INFRASTRUCTURE

4.8.1 Proposed Action

The BCC will be connected to the Fort Meade WWTP for utility services. Consumption of water, electricity, and natural gas are estimated in Table 4.9 for the first year of operation:

Table 4-9. Annual Utility Consumption

Utility	Annual Consumption
Water (kgal)	5616
Electricity (kWh)	536,640
Natural Gas (Mbtu)	1304

Source: Ameresco, 2006

More electricity will be required than other utilities. A relatively small amount of water and natural gas will be consumed during operations.

Water Systems

The proposed action will employ a process whereby sludge will be pumped from the WWTP to the BCC. Once received at the BCC, the sludge will be dewatered, and the excess wastewater will be returned to the WWTP for processing. Additionally, wastewater will be generated from all cleaning systems in the BCC, and for maintenance requirements, domestic water use (i.e. for the employee toilet room), water feed to the scrubber and the wet electrostatic precipitator, and general use. This wastewater will be fed to the WWTP via a 4” newly routed PVC sanitary sewer line at a maximum rate of approximately 38,000 gallons per day. A wastewater meter will be installed on the discharge line to allow for measuring the amount of wastewater discharged to the WWTP from the BCC. No impacts from the Proposed Action to the WWTP are anticipated.

Potable water distribution to the new facility would be accommodated within the capacity of the Installation’s current water supply and distribution system and would not require system upgrades. From the existing lines, a new 3-inch metered PVC water line will be connected to the new building. Existing lines are proximal to the proposed site and have sufficient capacity to accommodate the required level of services. No impacts to the potable water supply would be expected under the Proposed Action.

Electricity

Major electric service is located in close proximity to the proposed BCC. Building power and equipment auxiliaries will be connected to BG&E utility power through feeder lines from the existing WWTP service lines. Heat produced from the BCC process will be

recovered and used to dry the sludge and to heat the new building during the winter season. Therefore, electrical needs are not expected to peak seasonally.

The centrifuge will require more electricity than any other piece of equipment. The amount will be based on the type of motor utilized. Electrical needs of roughly 536,640 kWh are anticipated on an annual basis, and are considered manageable. Negligible impacts to electrical services are expected under the Proposed Action.

Natural Gas

Natural gas supplies from the commercial supplier, BG&E, are readily available at Fort Meade. The BG&E and government-owned systems loop the entire Installation so that almost every building is within a few hundred feet of an active gas supply. Privatization is not expected to affect supply.

A 2-inch HDPE natural gas line will be installed in the BCC to allow for a backup fuel source for the dryer heater, the biomass combustion system, and for use in two unit heaters. Natural gas will be used in the dryer heater and combustor for back-up only and during cold start-up of the process. The new line will connect from the existing gas line currently serving the WWTP. Natural gas needs of roughly 1304 Mbtu are expected on an annual basis, and are considered manageable. Impacts of the use of additional natural gas will be negligible.

Transportation Systems

Construction of the Proposed Action would only slightly increase the volume of traffic in the project area in the short term due to on-road use by construction and grading equipment, construction workforce vehicles, and vehicles delivering construction materials. Up to 15 trips may be required on a daily basis for construction equipment. Construction would include the addition of an access road from the main entrance drive of the WWTP to the new building, a length of roughly 200 feet. Construction and worker vehicles are expected to have sufficient parking space, which would avoid further disturbance to main roads. No significant impacts to traffic are expected.

During operation of a BCC, truck traffic on highways due to the hauling of sludge from the existing Fort Meade WWTP will be dramatically reduced. An average of over 700 truckloads of wet sludge is currently hauled per year. If loads are hauled an average of 181 days per year, this means that approximately 3.86 truckloads are hauled per day of hauling. Each haul travels approximately 215 miles round trip (Ameresco, 2006). Under the Proposed Action, only one truckload of dry ash would be hauled to a landfill per week. This is equivalent to roughly 52 truckloads per year – a reduction in truck trips by over 90 percent per year. In addition, mileage to and from the Millersville landfill, located within Anne Arundel County, or one of the other local landfills would be much less than the average mileage to and from the agricultural lands. Overall impacts on transportation systems are expected to be minor to moderate and beneficial.

The Proposed Action includes the construction of a 44-foot-tall emissions stack in the BCC building. Consultation regarding the potential impacts of the stack on Tipton Airport, which is located approximately 3,000 feet from the site of the proposed action, has been conducted. Under Federal Aviation Regulations Part 77.15, the Federal Aviation Administration (FAA) requires submission of a 7640 form when building any structure over 20 feet in height near an airport. In this instance, there are transmission towers between the stack and the airport. Trees and other objects surrounding the area are similar in height or taller than the proposed stack would be. Submission of a 7640 is not required (Peterson, 2006). In addition, the placement of the runway at Tipton Airport (facing east-west, where the ends of the runway point to 100 and 260 degrees on a compass) in proximity to the site of the proposed action further reduces the likelihood of conflict between the stack and air traffic, and thus the need for FAA approval. Tipton airport management does not believe the proposed project will impact the airfield use (Peterson, 2006), and no air traffic impacts are expected to occur.

4.8.2 No Action

Under the no action alterative, the construction and operation of the BCC would not occur. There would be no change in the demand for utilities, and utility lines would not have to be drawn to the proposed project site. Additionally, there would be no beneficial impacts realized from the alleviation in traffic associated with the hauling of sludge from the WWTP, and there would be no impacts on air transportation at the nearby Tipton Airfield.

4.9 SOCIOECONOMICS

The threshold level of significance for socioeconomic resources is the potential of the project to result in a substantial population increase or decrease at Fort Meade, a substantial decrease in employment, or a substantial burden to current end users of sewage sludge.

4.9.1 Proposed Action

Construction

Construction of the BCC is expected to last nine to 12 months and will require approximately 32 temporary construction workers. All but up to two I & C Technicians will be recruited locally from the Baltimore-Washington metropolitan area within daily commuting distance to Fort Meade.

While expansions at Fort Meade are expected to increase the WWTP user population, population on the Installation will not be affected by the construction of a BCC. Overall living conditions on the Installation would not change. No impacts to social conditions are anticipated. No significant impact on the area's economy is expected.

Operation

The BCC will operate 24 hours a day five days a week. The BCC will be staffed during daytime hours and will be remotely operated during evening hours. It will require the addition of one full-time operator hired by Ameresco. Maintenance may involve the use of additional part-time contractors.

Findings indicate that a BCC would be a highly valuable long-term asset to the Installation if both improved operational efficiency and long term cost stability relating to sludge disposal costs transpire. The initial capital investment of approximately $5,000,000 plus interest will be recovered in the first 12 years of the project. Estimated savings would be realized beginning after year 13 of the project, after payments are made for utilities, dry ash disposal, and operations and maintenance, as demonstrated in Table 4.10:

Table 4-10. Estimated Savings of Proposed Project

Performance Period Year	Proposed Annual Cost Savings ($)	Annual Contractor Payments ($)	Actual Projected Cost Savings ($)
13	1,593,161	1,427,922	**165,239**
14	1,640,956	784,379	**856,577**
15	1,690,185	992,797	**697,388**
16	1,740,890	771,313	**969,577**
17	1,793,117	729,223	**1,063,894**
18	1,846,910	733,429	**1,113,481**
19	1,902,318	997,834	**904,484**
20	1,959,387	776,306	**1,183,081**
21	2,018,169	817,060	**1,201,109**
22	2,078,714	821,793	**1,256,921**
23	2,141,075	865,027	**1,276,048**
24	2,205,308	1,021,787	**1,183,521**
25	-	-	**-**
TOTAL ACTUAL PROJECTED COST SAVINGS			**11,871,320**

Source: Bulgarino, 2006

Savings would total over $11 million over the 25-year life of the project. This is the amount of guaranteed savings of the project, and is in addition to the savings associated with the variable increases in costs of the No Action alternative from increasing fuel costs, labor costs, quantity of sludge produced due to growth at Fort Meade, and, inflation. The guaranteed savings are based on the avoided costs of the No Action alternative. Another risk facing land application of sludge is the increase in more stringent regulatory requirements which results in a decline in agricultural land that will accept sludge. Maryland's nutrient management regulations that control phosphorus levels in soils already impose limits on the amount of acreage available for land application of sludge. Over time, lands where sludge is currently used will not be able to

accept new sludge as they recuperate from the accumulation of the land applied nutrients. If current growth and development continues to burden farms, there may be even less acreage available for sludge use in nearby counties. Subcontracts with farmers to dispose of sludge may become more difficult to find. This would raise the cost of services, thus making sludge disposal from WWTPs more expensive. As a result of both guaranteed cost savings and elimination of future risks, the socioeconomic impacts to Fort Meade would be beneficial, major, and long-term.

Under the Proposed Action, the current hauling contractor would lose its current contract to haul sludge from the WWTP, which would result in the elimination of at least one full-time position. This net loss would be partially offset by the additional staffing required by operation of the BCC facility. It would not be considered significant given the extensive number of jobs available in the Baltimore-Washington area. Conversely, the hauling contractor could experience a decrease in revenues due to the loss of a major contract, which would have a minor to moderate, adverse impact on the company.

The Installation of the BCC will eliminate land application of wet sludge from the Fort Meade WWTP. In the short-term, farmers that currently benefit from the complimentary source of fertilizer provided by the Fort Meade WWTP may be economically challenged if they cannot receive equivalent amounts of sludge from other WWTPs, or from an alternative source of fertilizer such as manure. However, in the long-run, farmers in Maryland may not be impacted from the loss of sludge from Fort Meade. The state of Maryland has recently expanded its Manure Transport Program to include all feeding operations in the state, not just poultry operations. This helps in the effort to transition to phosphorus-based nutrient management required by the Water Quality Improvement Act of 1998. Through the revised Manure Transport Program, farmers from manure-generating operations are subsidized to transport excess manure to farms with nutrient deficiencies (MDA, 2006b). This cost-share assistance program may make manure a more competitive fertilizer option, perhaps eventually as competitive as sludge, for those farmers who must consider costs. Additionally, the use of manure as a fertilizer has fewer legal restrictions than the use of sludge. Farmers who are currently unable to receive cost-share assistance for nutrient management planning because they use sludge may, as a result, become eligible.

At the end of the initial 20-year contractor-operated period, the Army may assume control over all BCC operations and become the permit holder for the facility. No additional impacts are anticipated to occur from the transfer of operations, and any additional costs to Fort Meade from adhering to permit requirements are expected to be minimal. It is anticipated that the minor source operational permits required for air emissions from the BCC could be incorporated into the Installation-wide existing Synthetic Minor Permit without exceeding existing permit thresholds (Bulgarino, 2006).

Overall impacts to socioeconomics from the Proposed Action are adverse, minor to moderate in magnitude in the short-term, and, beneficial and moderate to major in magnitude over the long-term.

4.9.2 No Action

Under the No Action alternative, the BCC would not be constructed and sludge would continue to be hauled offsite and land applied. Future land disposal costs per unit are expected to continue increasing due to long-term fuel cost volatility, increasing labor costs, and increasing amounts of sludge produced as the Installation grows (Ameresco, 2006).

Unit costs for the land application of sludge are conservatively expected to increase by three percent per year over the next 10 years. Table 4-11 summarizes the projected increase in sludge disposal under the No Action alternative:

Table 4-11. Projected Annual Costs of Sludge Removal

	Population	Dry Tons	Cost per ton	Projected Annual Costs
2006	62,150	1,139	$1,496	$1,703,434
2007	64,200	1,176	$1,541	$1,812,389
2008	66,249	1,214	$1,587	$1,926,350
2009	68,298	1,251	$1,635	$2,045,516
2010	70,348	1,289	$1,684	$2,170,099
2011	72,397	1,326	$1,734	$2,300,316
2012	74,446	1,364	$1,786	$2,436,393
2013	76,495	1,401	$1,840	$2,578,564
2014	78,545	1,439	$1,895	$2,727,072
2015	80,594	1,476	$1,952	$2,882,171
2016	82,643	1,514	$2,011	$3,044,121

Source: Ameresco, 2006

As costs rise, the hauling and land application of sludge will become less cost-effective than other disposal options. As nutrients accumulate on farms from continuous sludge use, or if pollutant levels continue to exceed goals for waterways where pollutants are regulated, it may become increasing difficult to find appropriate acreage for land application in the state of Maryland. In the long-term, haulers may be forced to drive longer distances to find available land. As distance and fuel costs increase, transportation costs will rise. This would raise the cost of services, thus making sludge disposal less attractive for WWTPs.

As long as sludge continues to be the most economical fertilizer option for farmers in the short-term, many farmers will likely continue to accept sludge and its associated risks as long as regulations provide them with the option, and as long as the option continues to remain cost-effective for them.

The No Action alternative poses both high costs and an economic risk to Fort Meade, resulting in adverse, minor to moderate, long-term impacts to Installation socioeconomics. Beneficial, minor to moderate short-term impacts to socioeconomics from the No Action alternative would be realized by both the sludge hauling company and farmers who receive the complimentary fertilizer.

4.10 CUMULATIVE IMPACTS

CEQ regulations (40 CFR 1508.7) require an analysis of the cumulative impacts resulting from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these other actions. Cumulative impacts can result from individually minor, but collectively significant, actions. This cumulative impacts section of the EA addresses only the cumulative effects arising from considering the Proposed Action in combination with other ongoing actions at Fort Meade and other actions outside Fort Meade. The cumulative impact of the Proposed Action is evaluated within the context of the greater Fort Meade area, although the specific area of influence varies with the resource being addressed.

Fort Meade is expected to experience aggressive growth in the coming years, including an increase of approximately 15,000 new military, civilian and contractor personnel over the next 5 years, and, an increase of approximately 40,000 new personnel over the next 30 years, which is a 100% increase over current personnel levels (Bagnall, 2006). The main causes of the future growth of the Installation are an increase in EUL and other BRAC 2005 recommendations. As part of EUL, two million square feet of primarily administrative office space will be added to Fort Meade in the foreseeable future. Additionally, as part of BRAC 2005 recommendations, Fort Meade is a gaining installation for three proposed realignment actions:

- Department of Defense (DOD) Media and Publication Activities, with the addition of 663 personnel;
- Military Department Adjudication and Office of Hearings and Appeals Activities (in 2010), with the addition of 942 personnel; and
- Defense Information Security Agency (DISA) (in 2010), with the addition of 4,061 personnel.

The final approved BRAC Commission report identifies a total of 5,361 personnel/jobs (682 military/ 2915 civilian/ 1764 contract employees) realigning to Fort Meade, plus approximately 4870 indirect personnel (spouses and family members seeking employment). Total projected impact to Fort Meade is 10,231 personnel. This figure does not include DISA's projected potential 3,000 to 5,000 contract support personnel and 2,500 to 4,500 spouses and family members expected to accompany them. Projected

total impact to Fort Meade and surrounding communities is about 12,000 to 14,000 personnel. Fort Meade will construct new facilities for all three activities.

Additional Installation expansion activities that are proposed for the near future include:

- Asymmetric Warfare Group (AWG), with the addition of 150 personnel; and
- 902nd Brigade HQ & Operation Center, Training Support Division, with the addition of 216 personnel.

Both new construction and renovation of old buildings will occur with the planned future growth of Fort Meade, as well as co-locating of buildings and services to accommodate changes. The construction and subsequent operation of the BCC will not in of itself contribute any cumulative impacts to future growth and other planned construction projects at Fort Meade.

The BCC alone will not significantly affect air quality in and around Anne Arundel County, Maryland, which has been degraded by numerous industrial plants as well as activities associated with the large urban corridors of Washington DC and Baltimore, MD. Overall, the emissions released from construction equipment and the BCC will be an incremental addition to a larger air quality problem, as discussed in Section 4-3, and will contribute cumulatively to existing air quality issues in the region.

Establishment of the BCC is intended to accommodate projected growth at Fort Meade due to EUL, BRAC, and other activities. The increase of direct and indirect personnel associated with the future growth of the Installation will be accompanied by additional vehicular traffic in the area. None of the projects proposed in the foreseeable future on the Installation are anticipated to change current permitted air emissions thresholds. Currently, the Installation holds a Synthetic Minor Permit for several boilers, backup generators, a closed landfill, and gas stations. Additional emissions sources in the future may include several boilers and backup generators, but no major sources (Colianni, 2006). The BCC would therefore not contribute any cumulative impacts to stationary sources of air emission at the Installation. However, if the No Action alternative was selected, the vehicle emissions from hauling would contribute cumulatively mobile emissions from vehicles in and around the Installation.

The proposed action would contribute an incremental amount to cumulative non-point source water pollution in the Chesapeake Bay from air deposition of criteria pollutants. Water quality impacts associated with the continued land application of sludge on agricultural fields under the no action alternative would similarily contribute incrementally to cumulative non-point source water pollution in the Bay watershed. Overall, cumulative impacts from both the No Action and Proposed Action alternative are anticipated to be negligible.

4.11 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable negative impacts from implementation of the Proposed Action would be associated with both construction and operation activities.

Construction

Construction activities that would result in unavoidable adverse impacts include periodic high noise levels and fugitive dust emissions. These impacts would be short-term and generally limited to the immediate area. Removal of vegetation and compaction would occur in the work area with potential impacts on erosion, but to a very limited extent.

Fuel products (petroleum, oils, lubricant) would be needed to operate the construction of equipment. Emissions from equipment could contribute minimally to the short-term degradation of local air quality.

Approximately 12,281 square feet of previously disturbed land that may be habitat to a limited numbers of plant and wildlife individuals would be permanently developed for the facility.

Operation

Unavoidable long-term adverse environmental impacts due to operation of the BCC would include a slight increase in demand on the local infrastructure and utilities systems, including: a net use of up to 17,000 gallons of potable water per day to operate the facility; generation of 21,000 GPD (38,000 GPD as the maximum) of wastewater that would be returned to the WWTP for treatment; electrical needs of roughly 536,640 kWh on an annual basis; and natural gas needs of roughly 1304 Mbtu on an annual basis.

Intermittently, over a period of years, the BCC equipment would emit quantities of five criteria air pollutants: carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), particulate matter (PM_{10}), and volatile organic compounds (VOCs), in addition to several other substances. The types of effects that can occur from these pollutants include inhalation of fine particle that can then accumulate in the respiratory system and cause various respiratory problems. Trace amounts of greenhouse gas and mercury releases would be a negligible to minor adverse incremental contribution to the short-term degradation of regional air quality.

Minimal amounts of hazardous waste (i.e. fuel products, oils, solvents, degreasers), and relatively large amounts of solid waste including ash, would be generated from both construction and operation activities and would need to be disposed of. Wastes ultimately disposed of in landfills would also constitute an unavoidable adverse impact associated with the Proposed Action.

4.12 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Implementation of the Proposed Action would result in the irreversible and irretrievable commitments of resources including land, building materials, and supplies, and their cost; labor; planning and engineering costs; infrastructure capacity; federally owned property; and fossil fuels for construction vehicles.

Irreversible resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources would have on future generations. Such actions are considered irreversible because their implementation would affect a resource that has deteriorated to the point that renewal can occur only over a long period of time or at great expense, or because they would cause the resource to be destroyed or removed.

Irretrievable resource commitment of natural resources means loss of production or use of resources as a result of a decision. It represents opportunities forgone for the period of time that a resource cannot be used. Irretrievable refers to the permanent loss of a resource including extinction of a threatened or endangered species, disturbance of a cultural site, loss of land production, or use of natural resources (including minerals and coal). For example, production or loss of agricultural lands can be irretrievable, while the action itself may not be irreversible.

Construction Materials

Construction of the BCC would result in both the irreversible and irretrievable use of construction materials. Many of the materials used for constructing the BCC, in particular the steel and other metals that will have to be committed, are ultimately recyclable but would remain an irreversible commitment of resources for the life of the project. Other construction materials, such as insulation materials, plastics, concrete, siding, piping, and so forth, would in large part likely represent an irretrievable use of materials, as upon any demolition of structures at the end of the project life, these materials would be ultimately disposed of at a landfill.

Moderate quantities of fossils fuels would be irretrievably consumed during the construction of the power plant and its associated facilities. Diesel fuel and gasoline would be consumed by construction equipment such as bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, and compactors, and cranes, during the two years and seven months estimated for completion of construction activities. The consumption use of fuel during construction activities would not constitute a long-term drain on local resources.

The construction of the proposed BCC and its access road would require the commitment of approximately 12,281 square feet of land and its overlying vegetation. This commitment would be irreversible for the life of the facility. While it is possible that the BCC could be removed and the natural landscape renewed, this is unlikely in the foreseeable future.

Operation Materials

Operation of the BCC at Fort Meade would result in the irretrievable commitment of several resources, including potable water, electricity, and natural gas. Processing chemicals and maintenance chemicals such as oils, solvents and degreasers, would also be consumed during plant operations and would represent irretrievable commitments of resources to the Proposed Action.

4.13 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT & MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA requires consideration of the relationship between short-term uses of the environment and long-term productivity associated with a proposed action. This involves the consideration of whether a proposed action is sacrificing a resource value that might benefit the environment in the long term, for some short-term value to the sponsor or the public.

In the context of the short-term uses of the environment associated with the operation of the BCC and the long-term impairment of environmental resources as they have been analyzed in this EA, short-term refers to the that period of time encompassing the life span of the facility to the period of time encompassing its disassembly and subsequent restoration and rehabilitation activities. Long-term refers to that period of time following restoration and rehabilitation activities, during which consequent impacts from the Proposed Action still affect the environment.

Short-term uses of the environment under the Proposed Action include the development of approximately 12,281 square feet of land, temporary impacts to the physical environment during construction, and short-term socioeconomic impacts, including maintenance and construction costs and expenditure of public funds for site improvements. Short-term adverse impacts would result from vehicular noise and emissions during construction; these impacts would be mitigated, as required. The short-term need for construction laborers and local materials to complete construction would provide a negligible economic benefit.

The Proposed Action would enhance Fort Meade's long-term productivity by providing better facilities for service members, and by saving costs for disposal. Long-term savings may be used to fund other, environmentally beneficial, projects. Upon retirement and disassembly of the facility and, the developed land would be returned to uses similar to the currently existing use of property at Fort Meade. The projected period before natural conditions return to an approximate pre-project status within the project area is expected to exceed several decades following completion of restoration activities.

To the extent that the operation of the BCC contributes to the long-term increase in climate change and global warming due to release of air emissions including greenhouse gases, or contributes to the long-term increase in pollutant and trace metal deposition, this project does have a potential adverse impact on long-term productivity of air quality.

5.0 GLOSSARY

Affected Environment — The existing environment to be affected by a proposed action and alternatives.

Ambient Air — Any unconfined portion of the atmosphere: open air, surrounding air.

Attainment Area — An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the *CAA*. An area may be an attainment area for one pollutant and a nonattainment area for others.

Biomass — Renewable organic matter such as trees, plants, animal waste, industrial waste, and sewage sludge. Biomass is a renewable energy source that can be used to fuel specifically designed facilities.

Biosolids — Sewage sludge that has been treated to significantly reduce or eliminate concentrations of bacteria, viruses, and other microorganisms, and are suitable for recycling as a soil amendment (fertilizer).

Contributing Resource — A building, site, structure, or object that adds to the historic significance of a property or district.

Cultural Resources — Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason.

Effluent — Water that results from treating wastewater (for example, after preliminary, primary, secondary or tertiary treatment).

Executive Order (EO) — Official proclamation issued by the President that may set forth policy or direction or establish specific duties in connection with the execution of federal laws and programs.

Federal Acquisition Regulation (FAR) — The Federal Acquisition Regulations System is established for the codification and publication of uniform policies and procedures for acquisition by all executive agencies. The Federal Acquisition Regulations System consists of the Federal Acquisition Regulation (FAR), which is the primary document, and agency acquisition regulations that implement or supplement the FAR. The FAR System does not include internal agency guidance of the type described in 1.301(a)(2).

Fertilizer — A single or blended substance containing one or more recognized plant nutrient(s) which is used primarily for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth

Hazardous Material (HAZMAT) – Any useable material defined by law, which if released or spilled, may pose a hazard to human health or the environment due to its quantity, concentration, physical characteristics, chemical characteristics, or infectious characteristics. This material may

be used or stored aboard some vessels, or may be part of the original design or equipment on a vessel (e.g., asbestos in lagging, PCBs in electrical cable insulation).

Hazardous Waste (HAZWASTE) – Any unusable material defined by law that is liquid, solid or gaseous, which if improperly stored, treated, transported, disposed or otherwise managed, may pose a substantial present or potential hazard to human health or the environment due to its quantity, concentration, physical characteristic, or chemical characteristic. Unlabeled containers are assumed to be hazardous waste until proven to be otherwise.

Historic District — An area that generally includes within its boundaries a significant concentration of properties linked by architectural style, historical development, or a past event.

National Ambient Air Quality Standards (NAAQS) — Standards established by the USEPA that apply for outdoor air throughout the country. The NAAQS represent maximum air pollutant standards that the U.S. EPA set under the *CAA* for attainment by each state.

National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470 *et seq*.) — Enacted in 1966 and amended in 1970 and 1980, this federal law provides for a National Register of Historic Places to include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Such places may have national, state or local significance. The act provides funding for the State Historic Preservation Officer and his or her staff to conduct surveys and comprehensive preservation planning. The act establishes standards for state programs and requires states to establish mechanisms for Certified Local Governments to participate in the National Register nomination and funding programs. Section 106 of the Act requires that federal agencies having direct or indirect jurisdiction over a proposed federal, federally assisted, or federally licensed undertaking, prior to approval of the expenditure of funds or the issuance of a license, take into account the effect of the undertaking on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment with regard to the undertaking. This Council appointed by the President has implemented procedures to facilitate compliance with this provision at 36 CFR Part 800.

National Register of Historic Places (National Register) — A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the *Historic Sites Act of 1935* and Section 101(a)(1) of the *NHPA of 1966*, as amended.

Non-attainment Area — Area that does not meet one or more of the NAAQS for the criteria pollutants designated in the *CAA*.

Non-Contributing Resource — A building, site, structure, or object that does not add to the historic significance of a property or district.

Primary Air Quality Standards — A pollution standard based on human health effects.

Secondary Air Quality Standards — A pollution standard based on environmental effects.

Sludge — Any solid, semi-solid, or liquid residue removed during the treatment of municipal waste water or domestic sewage. Sewage sludge includes, but is not limited to, solids removed

during primary, secondary, or advanced waste water treatment, scum, septage, portable toilet pumpings, type III marine sanitation device pumpings (33 CFR Part159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Wetlands —Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

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APPENDIX A
AGENCY CORRESPONDANCE

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APPENDIX B
WWTP SLUDGE/ASH LABORATORY DATA

PENNIMAN & BROWNE, INC.

Facsimile Date: Tuesday, January 11, 2005

To:	Ameresco - Federal Solutions Nicole Bulgarino	Phone: Fax:	865-558-9459 865-558-8831
From:	Penniman & Browne Patrick Dunkes	Phone: Fax:	410-825-4131 410-321-7384
Date:	Tuesday, January 11, 2005		

Subject: PARTIAL TEST RESULTS FOR SLUDGE SAMPLE FROM FT. MEADE, MD.

PENNIMAN & BROWNE, INC.

CHEMISTS / ENGINEERS / INSPECTORS
INDUSTRIAL HYGIENE SERVICES
FOUNDED 1896

REPORT OF ANALYSIS

January 11, 2005

P&B Report No. : 044049
Laboratory ID: 04-13547
Purchase Order Number: Credit Card

Prepared For:

Ameresco Federal Solutions
1820 Midpark Road Suite C
Knoxville, TN 37921
Attn: Nicole Bulgarino

Date Received: 12/02/04 @12:30

Sample ID; Sludge -- Ft. Meade
Laboratory ID: 04-A13547

ANALYTICAL PARAMETER	METHOD	Results (as received)	Results (dried)
ULTIMATE ANALYSIS	ASTM D3176m		
Loss on Drying			96.12 %
Carbon	ASTM D3176m	37.10 %	1.44 %
Hydrogen	ASTM D3176m	5.62 %	10.97 %
Nitrogen	ASTM D3176m	3.15 %	0.12 %
Sulfur	ASTM D3176m	0.68 %	0.03 %
Chlorine	ASTM D3176m	0.21 %	0.01 %
Ash	ASTM D3176m	33.46 %	1.30 %
Oxygen (by difference)	ASTM D3176m	19.78 %	86.13 %
Heat of Combustion	ASTM D5865	6850 Btu/lb	266 Btu/lb

ANALYTICAL PARAMETER	METHOD	Results
MINERALS as OXIDES		
Mineral Assay of Ash (as oxides)	ASTM D6349	
Sodium	ASTM D6349	0.56 %
Magnesium	ASTM D6349	2.01 %
Aluminum	ASTM D6349	6.42 %
Silicon	ASTM D6349	18.52 %
Sulfur	ASTM D6349	4.42 %
Potassium	ASTM D6349	incomplete
Calcium	ASTM D6349	23.95 %
Titanium	ASTM D6349	1.78 %
Iron	ASTM D6349	24.79 %

PENNIMAN & BROWNE, INC.

CHEMISTS / ENGINEERS / INSPECTORS
INDUSTRIAL HYGIENE SERVICES
FOUNDED 1896

REPORT OF ANALYSIS

January 11, 2005

P&B Report No. : 044049
Client: Ameresco

Sample ID: Sludge – Ft. Meade
Laboratory ID: 04-13547

ANALYTICAL PARAMETER	METHOD	
Phosphorus Pentoxide	ASTM D6349	incomplete
Ash		33.46 %

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Patrick Dunkes, Petroleum Lab Supervisor

I. Steven Jaworisky, PhD, Laboratory Director

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Staff Judge Advocate
PAL Branch

2257 Huber Road
Fort George G. Meade, MD 20755-5030
(301) 677-9174/9756
Fax 301-677-9694/9940

Date: 17 May '04
To: Nicole Bolgarino
Fax: 865-330-7195
Re: Banf - sludge Analysis
Sender: ____Jeffrey C. Dozier
____Walter B. Chahanovich
__X__Gary T. Zolyak
____David Barrett
____Douglass Becker
____CPT Yvonne Sallis
____CPT Trevor Nelson
____CPT Adam Brake
____Mary E. McCauley

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COMMENTS:

Maryland Department of the Environment
1800 Washington Boulevard, Suite 605 • Baltimore, Maryland 21230-1719
(410) 537-3700 • 1-800-633-6101 (within Maryland) • http://www.mde.state.md.us

WASTE MANAGEMENT ADMINISTRATION
DESIGN & CERTIFICATION DIVISION
Sewage Sludge Analysis Report

1. Name of Sludge Generator: Fort Meade Wastewater Treatment Plant

2. Sample Date: 10/28/03 | **3. pH** 12.46

4. Sample Type: ☒ Grab ☐ Composite | **5. Solids Content** 5.9%

6. Sludge Type: ☐ Raw, Unstabilized ☐ Aerobically Digested ☐ Air Dried ☐ Composted ☒ Lime, Stabilized ☐ Anaerobically Digested ☐ Other (Describe):

7. Laboratory Name: Martel Laboratories JDS, Inc.

8. Results of Analysis: *Optional **Lime Amended Sludges

Parameter Analyzed		Value	Units	Detection Limit
Total Phosphorus	TP	12400	mg/kg	1000
Total Potassium	TK	<2400	mg/kg	2400
Total Kjeldahl Nitrogen	TKN	7.86	%	0.02
Ammonium Nitrogen	NH_4	0.25	%	0.01
Nitrate Nitrogen	NO_3	120	mg/kg	5
Cadmium	Cd	<5	mg/kg	5
Copper	Cu	64	mg/kg	5
Nickel	Ni	14	mg/kg	10
Lead	Pb	<50	mg/kg	50
Zinc	Zn	512	mg/kg	5
Mercury	Hg	0.42	mg/kg	0.05
*Arsenic	As		mg/kg	
*Molybdenum	Mo		mg/kg	
*Selenium	Se		mg/kg	
PCBs	PCB	<1	mg/kg	1
**Calcium Carbonate Equivalent	$CaCO_3$	220000	mg/kg	100

Certification: As an authorized representative of the above named sewage sludge generator, I certify that the above information is correct and complete to the best of my knowledge.

Name: B.R. Sharma | **Title:** Environmentalist

Signature: Balwant Sharma | **Date:** 25 November 2003

Phone: (301) 677-9171

Attach a copy of Laboratory Report

date 11/18/02
TTY Users 1-800-735-2258

MARTEL

Sensible Scientific Solutions

Certificate of Analysis

Thursday, November 13, 2003

Prepared expressly for:

Ft. Meade DPW EMO
239 Ross Rd.

Fort Meade, Maryland 20755

Attention: Sharma

Report for Lab No: 99576.
Samples picked up by Martel.
P.O. Number: DABJ31-03-D-0003
Project Identification: Limed Sludge Sample - 10/28/03

MARTEL NO.		CLIENT SAMPLE IDENTIFICATION	Sample Date/Time
99576	000001	Limed Sludge	10/28/2003 08:45

Compound	Test Value	Test Unit	Method	Detection Limit	Analysis Date/Time/Initial
Phosphorus (total)	12400	mg/kg	EPA 365.2	1000	11/03/2003 08:50 SK
Kjeldahl Nitrogen (Total)	7.86	%	EPA 351.3	0.02	11/06/2003 10:43 TB
Ammonia Nitrogen	0.25	%	EPA 350.2	0.01	11/12/2003 09:55 TB
Nitrate Nitrogen	120	mg/kg	EPA 9200	5	11/11/2003 10:50 BAS
Potassium	<2400	mg/kg	EPA 6010B	2400	11/06/2003 12:37 DLJ
Cadmium	<5	mg/kg	EPA 6010B	5	11/06/2003 12:37 DLJ
Copper	64	mg/kg	EPA 6010B	5	11/06/2003 12:37 DLJ
Nickel	14	mg/kg	EPA 6010B	10	11/06/2003 12:37 DLJ
Lead	<50	mg/kg	EPA 6010B	50	11/06/2003 12:37 DLJ
Zinc	512	mg/kg	EPA 6010B	5	11/06/2003 12:37 DLJ
Mercury	0.42	mg/kg	EPA 7470A	0.05	11/05/2003 14:04 BTA
pH	12.46		EPA 9045		10/28/2003 11:00 MTO
Solids (Total)	5.9	%	EPA 160.3		10/29/2003 10:10 JS
Calcium Carbonate Equivalent of Sludge	220000	mg/kg	ASTM C602	100	11/07/2003 16:30 BAS
PCB's as Aroclors by Capillary GC	<1	mg/kg	EPA 8082	1	11/04/2003 15:47 SAK

Martel Laboratories JDS **Inc.**
1025 Cromwell Bridge Road - Baltimore, Maryland 21286
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FORTME

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All Procedures used are in accordance with the following methods:

"Methods of Chemical Analysis of Water and Wastewater", EPA 600/4-79/020, U.S. EPA, Cincinnati, Revised March 1983. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, U.S. EPA Washington D.C., Third Edition, December 1996. American Society for Testing and Materials, "Annual Book of ASTM Standards".

QC _____ Approved T. Mereshoff

Date 11/13/03 Date 11/13/03